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The truth about twilight sleep

Mrs. Hanna Rion Ver Beck

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Dr. Carl J. Gauss, who with Dr. Krönig, developed the Freiburg method of painless childbirth

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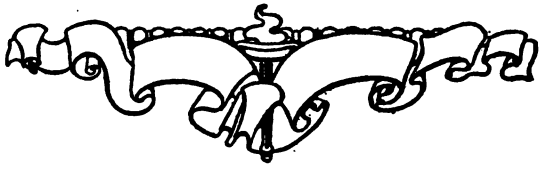

BY

HANNA RION (MRS. FRANK VER BECK)

AUTHOR OF

"Let's Make a Flower Garden," "The Smiling Road,"
"The Garden in the Wilderness," etc.

NEW YORK
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1915

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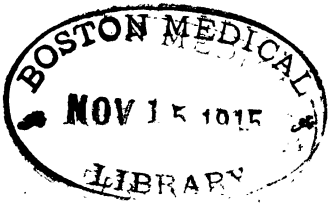

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FOREWORD

Medical science has at last solved one of the greatest problems of humanity — the agony of women in childbirth — but perhaps you do not realize that this method, popularly known as " Twilight Sleep," is being successfully used in Russia, France, Austria-Hungary, Germany, Finland, Japan, The Argentine, and England, Scotland, and Ireland to-day, both in maternity hospitals and private practise. It is in the hope that the spreading of this fact may bring comfort to all mothers that I have written this book.

I am not telling you anything from hearsay; I have spent six months in preparation for this work; for three of those months I was in close contact with the maternity hospital of Freiburg, Germany, where over five thousand women have been painlessly delivered by this method; I have translated almost two hundred thousand words of foreign medical reports on the use of the two drugs — hyoscin (or scopolamin as it is known on the Con-

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tinent) and morphin — which produce Twilight Sleep.

While a few of the early Continental reports are antagonistic and record failures, the British medical reports from the beginning are practically unanimous records of success. In the desire to leave no stone unturned whereby I might inform myself, I have visited as many of the British physicians as I could, begging them to enlighten me further on this vastly important subject, and I can assure you that the method of " Painless Childbirth " is now an established institution in Great Britain.

Though thousands of women have already been benefited by this humane treatment, yet there still remain thousands and thousands of other mothers who continue to suffer unrelieved agony at childbirth in utter ignorance that painless delivery is within their reach.

How shall we let mothers know this fact?

I know of but one way — for a mother, such as myself, to write to her fellow mothers telling them all she knows of the matter. The professional conservatism of the medical body prohibits it giving general publicity to any scientific development of medicine. The physicians are absolutely in the right when they avoid anything which may seem like advertising, for we cannot but realize the un-

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dignified position of a Friedmann in his exploitation of a tuberculosis cure.

The British doctors, for example, have been unostentatiously employing the method of Twilight Sleep since 1907; at various meetings of the medical association papers have been read on the subject of painless childbirth and have afterward been printed in the medical journals, which are the only proper channel through which such facts should be published — according to medical etiquette.

But what mother ever reads a medical journal? — unless, like myself, she is making exhaustive study of some subject which is only dealt with in such journals. The very audience, then, which is in crying need of information on this subject — the mothers themselves — are not reached and remain in ignorance of the great advance which medicine has made for their relief in their greatest hour of trial.

It is true that the mothers who have been so fortunate as to chance upon physicians employing the method, have done all they could by telling others, thus spreading the blessing by word of mouth propaganda, but this is at best a slow process. Only by a book directly written to women can the great mother-public be reached.

While among the Continental obstetricians a

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belief still exists that Twilight Sleep is best adapted to the hospital, the British doctors have proven that the method is entirely practical in private practise; this brings it also within the reach of mothers who prefer to have their babies in their own homes. Where it is employed in private practise, the doctors inform me, it is not at all necessary to keep the patient under constant supervision.

In writing of the simplicity and advantages of the method in private practise, one physician says: "It is capable of saving the practitioner many a worrying day and weary night and the patient much exhausting restlessness." To quote again: "It is difficult to describe the attractions in private practise of a method which relieves the patient's suffering while it allows labor to progress regularly and which does not require the constant personal presence of the medical practitioner, as the anesthesia with chloroform does." The fact that Twilight Sleep has been found practical in private practise by the British doctor proves not only the technical skill of the British practitioner, but it is also a guarantee of the safety of the method.

In one of the largest Scotch maternities, I was told it is now such a daily occurrence to give mothers scopolamin-morphin injections, it is taken as a

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matter of course and records are no longer even kept of these births.

So you see I am not heralding a new thing; I am writing to you of a scientific method of childbirth which has stood all the tests of experimentation and is now an accepted and perfected institution in many countries. Let us hope that within a year the same may be said of Twilight Sleep in America.

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THE TRUTH ABOUT TWILIGHT SLEEP

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I

The Question of Reducing the Pain of Childbirth

As far back as 1907 an American physician in writing of the method of Twilight Sleep said: "The dread of pain has been the great dread of the coming birth; until this discovery the 'pains of maternity' remained a horrid and incontestable truth, but these have vanished and the exhausting ordeal of motherhood is gone, to be seen no more." That last line is really the most remarkable message of comfort which has ever been sounded to women. Childbirth is the only physiological event of life which is accompanied by great suffering.

Has the doctor, whose duty it is to mitigate pain, the right to interfere during the natural pangs of

[1] "The Hyoscin Sleep in Obstetric Practice," by Woodbridge Hall Birchmore, M.D. *Medical Record*, Vol. 71, June, 1907.

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delivery? That is the question which has always faced the medical profession and which has never received from it a unanimous reply in the affirmative. In the dim past we find that the Hindu tried to exorcise the pangs of motherhood by the vapor of charcoal, which when inhaled caused a stupefaction of the senses. Curiously enough, it has been found by an English doctor that this same primitive method of vapor of charcoal is employed to-day by one of the African tribes, while another tribe soothes the mother's pain by means of intoxicating beverages.

Down through the centuries, while all so-called heathen races, inspired by that sympathy which runs like a thread of gold through all humanity, tried by sorcery and primitive devices to mitigate the sufferings of maternity, we Christians alone opposed every effort made for a modification of what we called the "normal, physiological pains of birth."

It was not until a certain historical birth took place at court that the solid wall of opposition was broken through — this event was in 1853 when Queen Victoria was painlessly delivered of a child under chloroform by Sir James Simpson. This royal birth caused this especial form of narcosis to be henceforth known as *chloroform à la Reine.*

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The first American child born in Freiburg. Mrs. Emmet of New York, her mother, was responsible for many other American mothers trying Twilight Sleep

This American boy was also born in Freiburg at the Frauenklinic

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To write of chloroform to-day would be archaic — nay, absurd, so well known are its merits and demerits — yet when chloroform was first introduced there was an almost overwhelming prejudice against its use. Aside from the opposition of the clergy to its employment in childbirth (the argument being that women had been condemned by divine command to bring forth in sorrow), it was furthermore opposed by the law, which declared the abrogation of consciousness illegal.

As great a blessing as chloroform has become for the obliteration of consciousness during severe operations, it has not proven the ideal means for the relief of women in childbirth. In fact, none of the usual forms of inhalation narcosis can be used to extend over the entire period of birth without fear of producing serious disorders of the vital organs. If given in small non-poisonous doses, the effect is insufficient to produce any distinct relief. Moreover, care must be taken that an anesthetic does not interfere with the functions of the muscles on which everything in birth depends.

Doctors have from time to time made experiments in childbirth with bromethyl, chlorethyl, nitrous oxid (laughing gas), antipyrin, cocain, and the medullary narcosis (injections in the spinal cord), but none of these have proved to be entirely

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effective, and after various trials have generally been abandoned. In view of the long list of experiments and the doubtful success of various methods, it was a scientific event of far-reaching importance when von Steinbüchel of Gratz made his first experiments in childbirth with the combination of scopolamin (or hyoscin) and morphin.

In 1905, Dr. Carl J. Gauss, of the Freiburg Frauenklinik, took up the study of scopolamin-morphin, and under the supervision of Geheimrath Dr. Bernhardt Krönig, he developed the method of painless childbirth which is now known throughout the Continent as "The Gauss Dämmerschlaf."

By slightly increasing von Steinbüchel's dose of the drugs, Gauss found that the patient remained in a state of clouded but not obliterated consciousness, and then he observed a most singular affection of the memory: events which had occurred before the patient had entered this state of clouded consciousness were perfectly recalled, while all impressions received while in this condition were entirely forgotten. To express this peculiar state — which more closely resembled a waking than a sleeping one — Gauss coined the word "Dämmerschlaf," which means a twilight sleep.

It might be asked why morphin was not employed alone to produce painlessness; because, when mor-

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phin is used alone and in sufficient quantity to become effective, it not only interferes with the natural phenomenon of birth, but it affects the centers of respiration as well. It was found that scopolamin did neither of these things, and when combined with a single small injection of morphin produced remarkable results. This combination of drugs was a most happy one, for while anesthetic and hypnotic qualities are common to both, their remaining properties are antagonistic and thereby their narcotic action is accompanied by a decided diminution of danger.

The chief charm of this anesthetic from the mother's point of view is that there is none of that first sense of terror and suffocation which accompanies an inhalation narcosis. No cone is used over the face, the drugs being administered by the hypodermic needle. The mothers, in describing to me their sensations after the injections, tell of a sense of drowsiness stealing over them, a pleasant feeling of don't-care-ness, which finally merges into an overpowering sleepiness. There is never a single disagreeable sensation associated in the mother's mind with the experience. There is no subsequent nausea, such as follows the use of chloroform. After the birth, the patient continues to sleep peacefully for four or five hours, and when she awakes it

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is difficult to convince her that everything is over. Scopolamin has a direct effect upon the nervous system and the brain, causing by its action an interruption in the mental associations or memory.

The patient treated by hypodermic injections of scopolamin-morphin remains to all appearances normal, she dozes between pains, and though she may apparently awake during the actual pains and even discuss them with those around her, it will be found after the birth is over that she has retained no memory whatever of the events which have taken place since the injections began to take effect. In other words, the drugs have obliterated memory for the time being, and as an English physician has expressed it: "If there is no memory of pain, it is equivalent to having had no pain, and a doctor then certainly has the right to speak of 'painless childbirth.'"

You see, the most remarkable quality of this narcotic is that while the mother retains her normal muscular functions and is in such possession of her mental faculties that she can obey the doctor's or nurse's requests — can, in fact, cooperate in the entire birth process — she afterward retains no memory of what she has done or of what has occurred, because of the interruption in her mental associations, caused by the peculiar hypnotic quality of

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scopolamin-morphin. If messages of pain are flashed along the nerve wires, they have been refused admission by her memory.

I think I can best describe the phenomenon by saying: it is just as if a message were sent over the telephone wires to central, but as the receiver at central has become disorganized, the message cannot be received and consequently never arrives at its destination. The mother, having no sense of pain or terror, makes no resistance to the contractions of the muscles; unimpeded and uninfluenced by mental distress the muscles can perform their intended functions as nature originally intended they should. This fact is pointed out by several doctors, and, as one declared after seeing a birth conducted with scopolamin-morphin:

"It was as if I had seen the natural action of a woman for the first time."

An important sequence of the obliteration of all memory of pain in the mind of the mother is the subsequent abolition of the mental and nervous shock usually coincident with childbirth. The strain of modern life upon the nervous systems of women results in what we call "high-strung nervous temperaments"—a condition which causes peculiar sensitiveness to pain and mental shock. I am told that the rather phlegmatic and muscular Scotch

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women of the working class suffer comparatively little in childbirth, while the more delicately constituted women of the upper classes are prostrated by the ordeal. It is to sensitive, nervous women that this method has proven an inestimable blessing. I shall quote Dr. Krönig [2] upon this phase of the subject:

"The demand that we obstetricians diminish or abolish suffering during delivery has become of late years more and more emphatic. Quite other demands than those of former times are now made upon the nervous system of the modern woman, and as a consequence she more rapidly shows a nervous exhaustion under the influence of pain. This sensitiveness to pain is greater in those who are engaged in difficult mental work than in those who live by manual labor. As a consequence of this condition of nervous exhaustion in mothers of the better class, we find the doctors often forced to use forceps to terminate the birth where there is no structural condition to necessitate their use.

"At a meeting of the Berlin Obstetrical Society it came to light that obstetricians were obliged to use the forceps in almost forty per cent. of all cases.

[2] "Painless Delivery in Dämmerschlaf," by Dr. Bernhardt Krönig. *Deutsche Med. Wochenschr.*, No. 23. 1908.

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"In the hospitals, unfortunately, the cases available for study consist for the greater part of women of no great intelligence, while in private practise we not infrequently have to deal with women of highly nervous temperaments — women who declare themselves incapable of enduring the pain of delivery to the end. A doctor, in such cases, often finds himself facing the alternative of either ending the delivery operatively with forceps or of retiring in favor of another physician.

"If we take the trouble to sit at the bedside of women of sensitiveness during the whole course of labor and observe the state of their nervous system, we are compelled to admit that in their case such nervous exhaustion does really set in, as a consequence of their suffering, so that the will power to hold out to the end is paralyzed. No one who takes the opportunity of observing a birth, in the case of a highly strung woman, from beginning to end, could afterward say that the physiological pain of birth is an advantage to the mother and must not be reduced. Such a statement could only be made by those clinicians who, having such a large number of cases, do not have the time, or take the trouble, to follow the nervous condition of mothers from beginning to the end of labor; they merely content

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themselves by ascertaining occasionally how the case is coming on.

"Any gynecologist who considers that he ought to be something more than merely an operative manipulator will feel that he should observe the nervous system of the mother; he will then not infrequently notice that neurasthenic symptoms appear in immediate connection with the delivery. This is not surprising. One would rather feel astonished that long continued exhaustion does not occur in women of nervous temperament more often than is actually the case, when one realizes what a sensitive woman has to endure during birth, aside from the mental impressions.

"Even earlier, during the period before the birth, the ground is prepared for this by numerous bodily disarrangements, such as nausea, loss of appetite, etc. As is well known, hypochondriacal moods often predominate in women during pregnancy. The woman has also heard from her friends how difficult is the birth of a child, and how eventually the doctor used forceps, and then puerperal fever followed the birth for a long time.

"In the case of a first child, the blood loss is usually relatively great and bodily exhaustion is added to the mental.

"It is true that robust women can endure birth

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without consequent injury to their nervous systems, but it is equally undeniable that if there is the slightest inclination to a neuropathic condition, such severe physical and mental injury results in a long period of exhaustion.

"If scopolamin-morphin only *reduced* the perception of pain, the value of the method would still be great, but it goes still further, completely abolishing all perception of the pain in eighty per cent. of the cases.

"The successful development of this method is principally due to the laborious observations and examinations of women in labor under scopolamin-morphin by my assistant, Dr. Gauss.

"In this method we now possess a procedure which, while in no way endangering either mother or child, has attained the end in view, viz.: the complete annihilation of the perception of pain in childbirth in eighty per cent. of the cases, and in the remainder a reduction of pain to its minimum."

In writing of the present-day horror of women of the danger and agony of childbirth, E. Temple Thurston says:

"It is terrible to think how rapidly this most natural of all functions — since upon it hangs the existence of all the people in the world — it is terrible to think how rapidly it is shaping into the

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awesome features of a disease. Women speak of it as of some dreadful operation, which indeed it has become. More women die in childbirth now than ever fell its victims when the services of a common midwife were all that were at their disposal. Such indeed is the horror of many mothers of the dread experience, that a fear of the coming ill germinates in the mind as the child germinates." To those of us who believe in prenatal influence, it would seem an inevitable result that the child would be blighted by this abnormal horror and fear in the mother's mind during pregnancy.

To those who have once slept the Dämmerschlaf, there is no dread whatever concerning future births; they know there will be no pain to endure during or after birth, they believe there is no danger for themselves or their children, and they rest assured that forceps will not be used unless complications make their use absolutely imperative.

Those old psychologists, the originators of the Spanish Inquisition, worked out their scientific system from their knowledge of the effect of pain upon the human will. Torture anybody long enough, they doubtlessly argued, and you will get what you want — retraction, promises, political secrets, lies, truth, or even death. It is just this same chemically deteriorating effect of pain upon the will

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which is largely responsible for the use of forceps to-day. I doubt if there is a normal woman in the world who would, before birth, entertain the thought of forceps with anything but horror, but that same woman put on the rack and tortured for twenty-four to forty-eight hours will beg the doctor to use the forceps, irrespective of injury to her child or herself — anything to have the agony over with! The use of forceps has almost entirely been done away with at the Frauenklinik of Freiburg since the development of the Gauss Twilight Sleep.

It is a barbaric idea that women *should* suffer in order to bring forth children. I have even heard the unnatural opinion expressed that the greater the ordeal through which the mother passes the more precious is the child to the mother. What an inhuman creed! — yet it is evidently held to-day even by some of the medical profession, for I heard an American physician ask a mother (delivered three days before by the humane method of Twilight Sleep), "Do you take the same joy in this child as you did in the ones you really *had?*"

This poor mother, in three former births, had suffered the most terrible and unnecessary agony; the result of the birth of her third child, which she "really had" by aid of instruments, was such injuries that she had been confined to bed with blood-

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poisoning for six months, and her souvenir of this very "real" birth was a stiff leg for four years.

I can assure you that where the mothers have painless childbirth their joy in their babies is tenfold. Many mothers have told me of the delightful surprise they experienced when they awoke to find a nurse standing beside the bed with a baby on a pillow, and in every case they declared that at first they simply could not believe the baby was their own, for they recalled nothing whatever of having given birth to the child.

No mother needs excruciating pain to endear her child; the baby has had nine months in which to become daily, hourly more precious — months of planning for and of dreaming of the little new life — months which are the most beautiful and tender in all the history of a woman's inner being.

The woman delivered painlessly, with her physical powers conserved, her nervous system unimpaired, is a far more capable mother. Furthermore, it has been declared by several obstetricians of note[3] that the use of scopolamin-morphin, far from reducing the milk secretion, augments it; statistics kept in hospitals of the Twilight Sleep mother's capacity to nurse, verify this assertion.

If the strength of the mothers of a nation is

[3] Drs. Kuenzer, Jusgen, Preller, and Lehmann.

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conserved during childbirth, if the children themselves are born under normal and safe conditions, that nation will, within twenty years, find itself spending less capital on the general wards of its hospitals. I have been permitted to see many mothers within twelve to fifteen hours after delivery by this method and I have never failed to feel astonished at their remarkable physical and mental condition. These mothers show no trace of having recently passed through the greatest physical convulsion known to nature. They are entirely free of bodily discomfort, they are amazingly gay, and display none of the exhaustion evidenced by patients who have become mothers in the old-fashioned, ordinary way.

Every mother with whom I have talked has declared that Twilight Sleep has removed all dread of having future children. In fact, many mothers declare they do not care how many children they may have, now that they know the wonders of this method. This is an important factor, for it is well known that the dread of the torture of birth deters many a woman with a mother's heart from bearing children. One of the leading woman doctors of England has said the adoption of this method will "induce a rise in the birth rate." With the dread of the pain of birth removed, how much happier

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are those long months of the mother's waiting for the coming of the baby!

As great cowards as most of us are where pain is concerned, I have never yet met a woman who considered her own relief before the safety of her child. The first question every mother asks, when the method of painless childbirth is mentioned, is: "But is it safe for the baby?" It is a great responsibility to take upon oneself to answer this question, and I do not do so without having made every possible investigation of this, the most important phase of the entire subject. At the Continental Maternity, which I have mentioned earlier, where over five thousand women have been delivered in Twilight Sleep, the statistics kept during the past nine years, since the adoption of the method, as compared to those of the preceding nine years, show that the rate of infant mortality has been reduced, since the adoption of Twilight Sleep, by a little over three per cent. Moreover, the rate of infant mortality in this hospital is markedly less than the figures of the general statistics of the Ducal State in which the hospital is located.

The consensus of opinion of the doctors in sixty-nine medical reports which I have before me is that scopolamin-morphin is without danger to the child. Among a series of 2,130 Twilight Sleep cases, only

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Frau von Kampst, of Freiburg, and her Twilight-Sleep baby

Mrs. Sargent, of Nebraska, and her Twilight-Sleep son

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1.1 per cent. of the children died up to the third day, while among five hundred consecutive cases in another hospital only seven children (1.4 per cent.) died during the first nine days. An investigation of the amount of scopolamin given the mothers of 318 children, of whom 285 were still living after one year, proved curiously enough that the mothers of children still living had received the larger injections of scopolamin,[4] which would certainly indicate that the injections had nothing to do with the deaths of the children.

In the early days of experimentation with scopolamin-morphin it was at first difficult to determine the exact dosage which would produce an insensibility to pain without coincident evil effects. In these first tentative experiments the mother was frequently given an injection too early in the first stages of the birth, or the amount injected was too great, or the last injection was administered too late in the final period of birth, and as a consequence of faulty technic the child was sometimes born in a sleepy condition, which seemed rather alarming until it was found that, even if no artificial efforts at resuscitation were made, the infant soon returned

[4] The mothers of children still living after one year had received at an average .00131 g., while the other mothers had received at an average .00126 g.

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to a normal condition and proved none the worse for its temporary condition of intoxication. As experience grew and the numbers of patients treated by this method reached into the thousands, a perfected system of dosage naturally established itself, and the children then came into the world in an entirely lusty condition of wide-awake-ness.

When the correct injections are given and at least four hours elapse between the first injection and the birth of the child, the baby is not affected in the slightest. As one practitioner has said: "If the child is born sleepy, it is not the fault of the method but the fault of the manner of dosage." Dr. Frigyesi[5] says: "The injections of scopolamin-morphin never caused the death of a single child." While Dr. W. A. Brodski[6] of Moscow has voiced the general opinion expressed by the British doctors who employ this method: "If correctly administered, scopolamin-morphin is entirely harmless to both mother and child."

I have been asked: "If you were to have another child would you have this method of painless childbirth?" I certainly should, even if I had to cross the world to find a physician who employs it.

[5] *Gesellsch. d. Aerzte.* Budapest, 1909.

[6] At the Eleventh Piragow Congress of Doctors held at St. Petersburg (Petrograd) in 1910.

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The only way in which the general adoption of the method by the entire medical profession can be brought about, is by the mothers themselves. Let every mother take up the fight for herself and her fellow-mothers and within a few years, as Dr. Birchmore says, "the exhausting ordeal of motherhood" will be "gone to be seen no more." I want to spare all whom I love needless pain, and I want all mothers who are personally unknown to me to realize that there is no longer any necessity for them to suffer the "pains of maternity."

All told, there are now medical records of over twenty thousand births in Twilight Sleep, while doubtless there have also occurred many cases of which no records have been kept.

The method has stood the test of experiments since 1903. Many doctors in Great Britain who reported in 1907 and 1908 on their initial cases, are to-day using the method with an ever-increasing faith in its effectiveness and safety. A method which can be proved to insure painlessness in childbirth with safety to both mother and child is of importance to all the women in the world; which is to say, it concerns eight hundred and eleven millions, six hundred and fifty thousand women.

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II

The Mother's Experiences

"I'D much rather have a baby than a bad cold." The mother who voiced the amazing preference of childbearing to cold was Frau Anna Straub, the wife of a Freiburg-in-Baden schoolmaster.

There is a very old German proverb—"It is easier to bear a child than to have a tooth pulled." In the face of the above remark, this adage would seem to have been nothing less than an inspired prophecy.

I sat beside Frau Straub on the particular place of honor on the holy German sofa and begged her to tell me all about her experience in childbearing.

"My brother is a doctor," she said, "and when he found I was to become a mother, he told me to go to our Freiburg Frauenklinik to have a scopolamin birth.

"I had never heard of such a thing, neither had my mother.

"Then my brother told me it was something

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which the doctors injected with a hypodermic needle to take away all pain in childbirth.

"I listened respectfully, but I thought to myself, I don't know whether I want experiments tried on me or not; I shall probably have the baby just as my mother had me. But I didn't. As the time of birth drew near I made up my mind to go to the Frauenklinik, though I was still a little undecided on the question of having that new thing used, but I changed my mind on the subject with the first pain. I even begged for it.

"Dr. Vogt, who was attending me, said, 'I will give you an injection as soon as the pains begin to come at intervals of ten minutes apart. Don't be afraid, there will be *no* severe pains to endure at all, just be patient and believe me.'

"But I couldn't.

"I grew so excited and nervous over the unknownness of what was coming I made it more difficult for the scopolamin to take effect when it was eventually given me.

"They made the injection in my hip and I remember quite distinctly receiving three injections, then I simply grew drowsier and drowsier until I felt as though I were in a 'Dusel'— as the German slang saying is for drunken stupor — and then I was asleep.

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"But though I thought I slept soundly and peacefully and knew nothing of what was going on about me, I was, nevertheless, behaving very badly, as the result of my great excitement of mind beforehand, for they afterward told me I had had a perfect wrestling-match with the head nurse.

"It was about ten at night when I went to sleep and the baby was born between five and six in the morning, but I slept on soundly until about nine o'clock and woke up feeling as one feels after a beautiful night's rest.

"For the moment I had quite forgotten where I was, and that I had, only the night before, been in such a state of nervousness over the expected birth, but as I opened my eyes and saw that I was in the Frauenklinik it all came back to me.

"I then realized, with a sense of terror, that I was there for the purpose of childbirth, which I thought I had yet to go through.

"Then I heard the voice of a nurse, asking if I felt hungry. I said yes, and I then saw that she was standing there with a bowl of 'Gerstenschleim' (a thin sort of gruel) and then she said, 'It's a girl.' 'What's a girl?' said I, and she said, 'Your baby, of course.'

"I don't think I ever felt so happy before in my life, for I suddenly realized it was all over, the baby

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was safe, and I had not suffered at all. In about two hours the nurse said she would like to make the bed and asked me to get up, so she could do so. I did and stood near while she beat and turned the mattress. I felt perfectly well. At five that afternoon I had my usual cup of afternoon coffee, and at supper that night, I remember, I ate *two* boiled eggs.

"The next day I was ravenous and ate everything I wanted, including a fine big piece of beefsteak for dinner.

"On the afternoon of the second day, I held a perfect levee, and all my friends came in to see me and my little girl.

"My mother was really horrified by such revolutionary behavior.

"On her asking the doctor if he did not think it unwise for me to be having such excitement, the doctor replied, 'Your daughter is no longer under *treatment;* she is merely *under observation.*'

"On the third day I walked all about the halls of the Klinik, but as it was winter and very cold I did not go outdoors." (Frau Straub really said this quite apologetically.)

"The baby," she resumed, "was born on Friday and on Tuesday we had a fine christening downstairs, which I attended, and we named the baby Marga."

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The tone with which she said these final words was the tone with which one should read the closing lines of a fairy story that ends:

"And then they were married and lived happily ever after."

But thanks to the German professor-doctors, this was not a fairy tale I was listening to — it was the simple, truthful statement of a mother telling me, as clearly as she could recall, the actual experience of bringing her first child into the world.

I then asked for the still more matter-of-fact details of the expense of such a luxurious and delightful childbirth.

She said there were four classes of childbirth to be had in the Frauenklinik and that she had experienced that of the second class.

For the services of doctor and midwife, if matters took their ordinary course and there were no complications, the charges were fifty marks ($11.90).

For board and bed five marks ($1.19) a day.

For baby, if suckled by the mother, fifty pfennigs (12½ cents) per day.

It is preferred that mothers do not bring infant clothes; the Klinik supplies them, and the linen is the same for all classes.

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Frau Straub's bill for medicine had been nine marks ($2.14) in all.

Of her second child's birth, three months ago, there was practically nothing to tell, for as she felt no fear or excitement beforehand, she had gone to sleep more quickly and had really had no experience at all. The only individual characteristics of the second birth were as follows: Baby born at two A. M.; sat up next day at table to eat her midday dinner; baby born on Saturday, the mother attended christening downstairs on Tuesday. (Tuesday is evidently christening day at the Frauenklinik.)

"You would like to see her — the little bundle?" she asked.

"Yes, indeed — both of them, if I may," I begged.

She returned with the last baby in her arms, the little Marga clinging to the edges of her mother's pretty German apron.

They were a wonderful trio.

Frau Straub is a most splendid Teutonic creature of the Wagnerian type. The soundly sleeping "bundle," wrapped in a blue thing like an Indian papoose, never knew a thing about my extravagant admiration of her. The red-cheeked, plump little Marga in her red pinafore, dodging from one side

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of her mother's skirts to the other in her embarrassment, was a replica in miniature of her robust mother.

"They don't look as if scopolamin was very injurious, do they?" asked Frau Straub with a merry smile.

Mrs. Emmet of New York was the first American mother who had a child in Dämmerschlaf. Six years ago she merely chanced to be in Freiburg at the time of her confinement and went to the Frauenklinik and so stumbled by accident upon the scopolamin method.

She was so charmed by her first experience that she has since returned to Freiburg for the birth of two other children. Mrs. Emmet told her friends about painless childbirth and several of the friends decided to follow her example. They braved the Dämmerschlaf, found it perfect and told their friends.

Now a most significant feature of all these American mothers is that in every case but one they were mothers who had been injured in former births; they went to Freiburg because of further dreaded complications and agony.

The exception was an American who found herself at the age of thirty-eight about to become a mother for the first time; having heard the per-

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sonal experience of a friend who had followed Mrs. Emmet's example, this mother-to-be, realizing the danger of a first birth at her age, decided she would stand the best chance of a safe delivery under the scopolamin-morphin method.

In these American mothers Drs. Krönig and Gauss did not have one normal case with which to deal; they were mothers on whom forceps had been used in former births, women with tendency to hemorrhage and placenta previa, one with a four years' disabled leg from blood poisoning resulting from use of forceps, and one of thirty-eight becoming a mother for the first time.

One might say surely it would be scarcely fair to judge the method of Dämmerschlaf by the cases of these women; in the face of this how much more emphatic then are the results. We find that in every one of these complicated cases the success of scopolamin-morphin was absolutely perfect. In no case were the forceps used, there were no disagreeable side effects from the drugs, no child was born in an intoxicated condition, the mothers were in every case oblivious of the entire birth process, none of them suffered a pain either during or after birth, they all made immediate recoveries and all were up and about the fifth day, some earlier.

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Strangely enough, of the eight American women who have experienced Twilight Sleep I found seven still remaining in Freiburg. This fact seemed so odd that I asked: "Haven't any of you people homes?" They laughed and explained. Two were staying in Freiburg because they had German wet nurses and they did not want to make a change of "cow" until the babies were older.

One had returned to Freiburg to bring her sister-in-law to be operated upon by Dr. Krönig. One was married to a professor in the university. One had returned to Freiburg to study the method for professional purposes. One had just been delivered of a child at the Frauenklinik. As for the seventh, I am sorry to say I can tell you nothing, as she did not care to discuss the birth of her baby. The very different attitude of the other scopolamin American mothers was embodied in a reply made to me by one of them, when I asked her if she had any objection to my giving publicity to her experience. "Objection!" she cried. "Why, we are all so anxious to make this thing known to the women at home we'd welcome you and tell you everything we know about scopolamin even if you were going to publish it in the *Police Gazette!*"

It was one afternoon at tea in Freiburg when all my guests were American mothers who had been

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confined under scopolamin-morphin. Mrs. Sargent of Nebraska, whose scopolamin baby's second month birthday party I had attended a few days before, first told her experience.

"I didn't even feel the injection of scopolamin," she said, "for they first used cocain on the spot before using the hypodermic needle. Very soon after I found myself growing drowsy and in about half an hour I fell off to sleep just as naturally as I do on any night when going to bed.

"The next thing I knew I was awake and I heard the sympathetic voice of Dr. Krönig saying, 'All ees well,' and then I thought to myself, 'I wonder how long before I shall begin to have the baby,' and while I was still wondering a nurse came in with a pillow and on the pillow was a baby, and they said I had had it — perhaps I had — but I certainly can never prove it in a courtroom."

"That's the only thing I don't like about it," said another mother; "there is nothing to talk about afterwards. You just go to sleep and have a pleasant but vacuous night and when you wake up they present you with a perfectly brand new baby and tell you it is yours, and you have to accept it on faith and feed it and keep it."

"And on the fifth day you get up for good and all," said Mrs. Cecil Steward of New York; "that's

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the fashionable day with us, though some were more precocious."

"And on the sixth day you get into a motor," continued another, "and you go about fifty miles somewhere up into the Black Forest and there you have tea and — well, that's about all."

"What I like about Dr. Krönig," said one American, "is he doesn't believe in the goodness of pain. He even thinks pain, and the mental condition resulting from it, a positive hindrance in childbirth."

"This relief of suffering in childbirth," said Mrs. Mary Boyd, "is not only a humane step taken by science to benefit motherhood, but it also promises to raise the function of childbirth from a gross and primitive physical agony to a normal unimpeded muscular process which can be entirely directed by the obstetrician."

"I was a bit hysterical," said one mother, "and they just gave me a small whiff of chlorethyl which made me unconscious for about five minutes, which caused the very first injection of scopolamin-morphin to take immediate effect."

"The only after effects of scopolamin," said Mrs. Boyd, "are, a slight defect in the eyesight [something like that caused by belladonna], which lasts about forty-eight hours; then for about half a day there is sometimes a trifling numbness in the

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hands and feet, a disposition to break out in perspiration, and a dry throat which makes you want to drink water, and that is literally all." Comparing this to the after effects of other anesthetics one must feel that the aftermath of scopolamin is very insignificant.

I then inquired about the expense of having these American first-class babies.

For room, according to size, eight ($1.90) to fifteen marks ($3.57) a day. Child bed supplies, twenty marks ($4.76); midwife's fees, fifteen marks ($3.57).

For wet nurse, three marks and fifty pfennigs (84 cents) per day.

Incidentals from forty ($9.52) to one hundred marks ($23.80).

The doctors' fees vary according to doctor and case, but they are always exceedingly reasonable.

I found that the experiences of these American mothers are entirely typical, and that after one has heard the stories of a dozen or more mothers the similarity of detail and a lack of exciting adventure robs the subject of variety.

The experience of a mother of the German nobility, who most courteously and gladly gave me every detail of her second baby's birth, is, as you

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will see, very similar to the foregoing instances, except in one interesting detail.

"I had had a frightful experience in Berlin," she told me, "with the birth of my first child, so when I found the birth of my second approaching I decided to come to Freiburg to the Frauenklinik, not knowing, however, anything of Twilight Sleep, but merely because of the reputations of Dr. Krönig and Professor Gauss. Naturally I was a bit nervous when they suggested the use of the, to me, unknown drug in my delivery, but when they said I would know no pain, the memory of my agony in Berlin decided me.

"The injections of scopolamin were made on either side of my chest above the breasts"— [I presume the location had something to do with her nobility] —"and within twenty minutes I found myself going to sleep. I awoke at one time sufficiently to see that there were doctors and nurses around me, but I had no desire to speak to them and I was unconscious of any pain. The Geheimrath (Dr. Krönig) happening to look at me exclaimed, 'Why, she is awake,' and quickly laid a cloth over my face. As soon as the visual impressions were removed I immediately fell asleep again, and when I awoke the next morning I was perfectly amazed when the nurse presented me with a little

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girl. On the fourth day I was walking about, feeling absolutely well. In Berlin I was in bed four weeks and did not recover my health for months."

The one significant detail of this experience to me is that out of all the American and German mothers whom I met in Freiburg, this is the only case of a mother consciously awakening, even momentarily, after the Dämmerschlaf was established.

The mothers of the fourth class, delivered in the free ward of the Klinik, are very difficult to get at, but I found one — a poor girl who had deliberately become a mother for the professional purpose of becoming a wet nurse. In her simple way she put the whole matter in a nutshell: "Why, you don't know a thing about having a baby, do you?" That was all she had to say.

In the case of Frau Stammnitz, the wife of the Stadt Architect of Baden, the doctors had an exceedingly difficult case with which to deal. It was the fourth child, and her experiences in childbirth without scopolamin had hitherto been as follows: The birth process of her first child had continued in unabated suffering from a Sunday until the following Thursday and then forceps eventually had to be used to terminate the birth; she was badly torn

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and the wound not being properly attended blood poisoning resulted and it was a question for weeks whether her life could be saved; she was confined to the bed for two months. Her second childbirth continued over the period of three days; there was a severe hemorrhage from a bursted vein from which she lost over a pint of blood. The third birth consumed three days and left her with hernia of the navel. After these frightful experiences Frau Stammnitz was persuaded to go to the Frauenklinik for the birth of her fourth child under Twilight Sleep.

In all three of the former births without scopolamin there had been a marked weakness of labor, so it is not at all surprising to find that after the first injection of scopolamin-morphin all labor ceased. The doctors had to wait for twelve hours before labor recommenced, the second injection was, therefore, not given until after the thirteenth hour. This injection did not diminish the action of the labor, but neither did it succeed in reducing the pain. The third injection also failed to produce a condition of Dämmerschlaf. It was not until the fourth injection was given that Frau Stammnitz became oblivious of the birth process, but from that time on the drug was effective and she did not realize the final expulsion of the child.

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The birth consumed forty-eight hours, which we find on comparison with the length of former births was a distinct improvement. No forceps were used, there was no hemorrhage, the birth was entirely spontaneous.

Frau Stammnitz continued to sleep for four and a half hours after the birth and then awoke to find herself not only free from discomfort but refreshed. The fifth hour after birth she got up and walked about the room.

In the afternoon she was carried downstairs and then, on the arm of her husband, walked constantly for one hour about the Frauenklinik grounds. A woman sitting in the garden came up to Frau Stammnitz and said, "Excuse me, madame, but is it possible that you are the lady who could *not* have her baby yesterday?"

In telling me of her experience Frau Stammnitz said: "You will doubtless hear the objection brought by the opponents that scopolamin is not thrown off as quickly as is claimed by Gauss and that in reality the mother is left in a semi-narcotized, stupid condition for a day afterward. Nothing could be further from the truth in my case; to refute that claim I would like to tell you of my first day after the birth of my scopolamin child: He was born on the 9th of July and it so chanced

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that the ninth is also the birthday of our Grand Duke; this particular birthday was the first that the Duke had celebrated since his accession.

"Six hours after the birth of my boy it occurred to me that I should commemorate the occasion by writing a poem to the Grand Duke. I thereupon consumed the entire forenoon in the composition of a poem of four pages. This surely would not indicate that my mental faculties were dulled by the drug."

The remarkable activity of Frau Stammnitz during this first day after a forty-eight hours' birth was indeed wonderful, embracing, as it did, not only the hour's walk in the garden during the afternoon but the creation of a long poem in the morning. Even if it is quite aside from the subject-matter of this chapter, I would like to tell you of the poem and its delightful sequel. The subject of the first part was the excessive patriotism shown by the boy which had inspired him to prolong his mother's labor for forty-eight hours in order that he might be the first subject born on the first anniversary of the birthday of the Grand Duke celebrated by Baden. Frau Stammnitz then recalled to the Duke's memory that at the age of ten she had been appointed to be the deliverer of a bouquet of flowers, on a certain great occasion, to his

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Dr. Bernhardt Krönig, who, with Dr. Gauss, developed the Twilight Sleep method

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mother, the Grand Duchess. His mother on accepting the flowers had greatly disconcerted the little girl by asking, "Do you like knitting?" The child was miserably confused, as she did not dare speak the truth of her sentiments in regard to this art so sacred to Baden — in fact, to all Germany. Great was the relief of the little girl when the Queen of Sweden, sitting beside the Grand Duchess, came to the rescue by saying, "If you don't like knitting, say so. I hate it myself."

In reminding the Duke of this incident Frau Stammnitz said, "This same little hate-knitting girl is the mother who now, six hours after the birth of her boy, lays at the feet of Your Highness a loyal subject and future soldier of Baden, consoled in that thought that she is not the mother of a much-desired girl."

A personal letter of pleased appreciation arrived in a few days, then two months later, when Frau Stammnitz had just issued invitations for the baptism next day of her baby, another letter arrived from the ruler of Baden; the Grand Duke wrote to request the privilege of becoming the godfather of the boy. "You may imagine how quickly I sent word to all my friends canceling the invitations for the next day," laughed Frau Stammnitz.

On the following Sunday the Grand Duke became

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the godfather of his little scopolamin subject and a few days later there arrived a most beautiful silver cup on which was engraved the royal crest and below that the monogram of the son of Frau Stammnitz.

Before the Twilight Sleep was developed there were only two sisters (nurses) in the first-class maternity ward of the Frauenklinik, but so interested was the Grand Duke in the development of the method, he made a very handsome gift to the Frauenklinik which enabled them to increase the maternity force of nurses to five. This interest in painless childbirth taken by the Grand Duke Frederick II and the Grand Duchess Hilda, and their generous assistance to the Frauenklinik, has a touching pathos for the reason that these much beloved and kindly rulers of Baden are childless.

"It is also claimed," said Frau Stammnitz, "that scopolamin affects the mental development of the child. As to that, I can only say that, in spite of the rule prohibiting the admission of children into our schools before the age of six, such was the precocity of our boy, this rule was set aside in his case and he was admitted when five and a half." As for this boy's physical strength, a little example will suffice. On his first day at school, when questioned about himself by the teacher, childlike, he proudly

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stated that he was the godson of the Grand Duke Frederick. At recess, several older boys came up and one said, "We don't like liars in this school. When a boy lies he has to fight. Now take back what you said about the Grand Duke." The Stammnitz boy said: "It's no lie — I'll bring my cup to show you to-morrow — but I'll fight you just the same," which he did with such success that the fights of that day were the last ones he has ever had in that school.

Frau Bissinger, the English wife of a German civil engineer, is the mother of four scopolamin children. Her first baby was born far up in the Black Forest mountains, the scopolamin being administered by the village doctor. "While mitigating the pain," said Frau Bissinger, "the injections of scopolamin-morphin were not a complete success; the physician was inexperienced and knew much more of the theory of Dämmerschlaf than of the actual practise. I remember how infuriated I was. This doctor showed me an object for the third time and I assured him I recalled it perfectly. He replied, 'You only *think* you recollect it; as a matter of fact you do not.' Then when I told him I was still suffering acutely, he calmly told me I only thought I was suffering and that after birth

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I would find I had suffered nothing. He was entirely mistaken; I recalled all the pains distinctly up to the latter part of the birth when the injections finally did become effective and obliterated consciousness of the end.

"It was not, however, until I had my second child at the Frauenklinik under the care of Dr. Krönig and Professor Gauss that I realized the tremendous difference made by the personal skill, science, and technic of the doctors conducting the Dämmerschlaf. The Twilight Sleep of Gauss was in no way related to that of the Black Forest doctor. I suffered nothing whatever during the birth process of my second child at the Frauenklinik. I merely recall the occasion as one of a delightful night's sleep followed by a very pleasant day on which my most intimate friends called to congratulate me on the birth of my first son.

"This birth robbed me forever of fear of future births, for I knew as long as I lived within reach of the Frauenklinik I need never suffer a pang — and I haven't. Of the third and fourth births there is nothing to tell, for I knew nothing whatever of either births; I recovered immediately and my health has seemingly been bettered by every birth until — well look at me now!" I looked,

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and what I saw was a most beautiful woman of apparently about twenty years of age, a picture of perfect health, strength, and beauty. Frau Bissinger is a representative scopolamin mother.

On the faces of these mothers are written no lines of pain, their eyes are clear, their flesh is firm, and they have no *nerves.* As a preserver of youth and beauty alone, the Dämmerschlaf should make a wide appeal to all women. One of the most amazing things of all is that out of dozens of German and American mothers whom I met in Freiburg, I did not find one mother who had felt the slightest pain after birth.

In the cases of German mothers, who have never borne children without scopolamin, I found an evident surprise on their part that I should inquire about pain or soreness or bearing down after birth.

One of these fortunate mothers replied: "But surely no woman ever suffers anything *after* the birth is over!" The remarkably quick recovery of all Dämmerschlaf patients would seem to prove beyond a doubt that the slow convalescence of the ordinary confinement case is largely due to the nervous and mental shock resulting from prolonged and exhausting agony. At the Frauenklinik, after birth, they make the mothers perform certain bed-

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exercises (to be described later), which correct the relaxation of the uterus, and reestablish a normal muscular condition.

The patients do not have to remain in bed in a flat position, and there is no necessity for bandages. As a rule, they get up and walk about their room for a short time the first day, the second day they go to one of the sun parlors of the klinic and walk about the halls, on the third day they either go for a walk outside, or a ride in a motor. In fact, the mothers feel so very well it is difficult for the doctors to restrain them from over-exertion and from leaving the klinic too soon.

Judging only by their condition of physical comfort the mothers forget the drain on the system of the past nine months, the tension of the muscles, the great general bodily strain of birth, all of which should undoubtedly be followed by a reasonable amount of rest and relaxation. I remember hearing a mother say to Dr. Gauss on the second day after the birth of her baby, "Oh! I feel so well, it's all foolishness keeping me in bed. I want to get up and tango." "All right," laughed Gauss; "I make the engagement to tango with you tomorrow morning." This was a woman who had been a helpless invalid for years up to the time of this scopolamin birth!

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The Twilight Sleep mothers of my acquaintance in Freiburg were mothers of children ranging in age from one day to seven years, and in every case I found the mothers in a state of remarkably good health.

I was sent to Freiburg in May, 1914, by *The Ladies' Home Journal,* to investigate painless childbirth.

After writing my article on the mothers' experiences, for this magazine, I decided to remain to investigate the subject from the medical point of view. The American mothers may ask: "If this method has been in use for nine years in Germany, how is it that we mothers of America have heard nothing of it?" It is a question which we may all well ask. But for the word-of-mouth propaganda of mothers who have had the Dämmerschlaf and the investigation of the method by American writers, the lay public would still have no knowledge of scopolamin.

An American mother who had been delivered of a child some years ago under scopolamin-morphin in Freiburg found herself in New York about to become a mother again; she knew of one American physician who had remained in Freiburg for the unprecedented time of six months studying the

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method, so she wrote Dr. Krönig asking if he thought it would be safe for her to go to this American doctor for the birth of her next child. Dr. Krönig replied: "I cannot advise you. I must however remind you of the fact that the physician has only had six months' study of scopolamin-morphin."

And yet during my residence in Freiburg I saw doctors of all European nations, England and America, come for a few days' or a week's investigation of births under scopolamin-morphin and go away with positive opinions on the merits or demerits of the method! The literature of scopolamin-morphin is as yet largely confined to Germany and is scattered throughout the German medical magazines. It took me three months to collect and translate all the reports upon the subject. I was particularly careful to obtain all the reports of Gauss' opponents and the records of the Continental hospitals where the method has failed, for it is only by a conscientious study of both sides that one can arrive at a fair conclusion.

Fortunately I completed my last translation on the 25th of July. Already there were disquieting rumors of war in the air and Baden was palpitating with unsuppressed excitement. As my train left on the night of the 26th, I departed to the

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music of "Deutschland über Alles"— bursting from the throats of hundreds of patriotic students on the platform of the Freiburg station. As I now, three weeks later, write these lines, I am saddened by the thought that Dr. Gauss — the man who has given nine years of his life to the development of this method of Dämmerschlaf, is now at the front, as a surgeon and a reserve of the German flying corps.

I pray Heaven that this book is not destined to be a memorial: may it only prove to be a study of the early work of a man who was spared to continue the researches he was engaged upon when interrupted by the cruel call of war — the development of the use of radium in cancer.

Now that this great tragic war has cut Germany off from the outside world, Freiburg has become as inaccessible to American mothers as the poles, and travel to Great Britain is not pleasant. It is, therefore, strangely forced upon the American physicians to *give their women at home what they can no longer go abroad to seek.* The time has come when we mothers must unite in a unanimous appeal to the American medical body for an unprejudiced investigation by them of Twilight Sleep, carried out with a strict adherence to the Gauss rules.

That this method has failed in some Continental

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hospitals is a matter of very serious importance, and for that reason I shall give a thorough account of all these failures in the hope that like failures and danger to mother and child shall be avoided when the method is generally adopted in America.

The Freiburg method has been successfully adopted by four other large European clinics, viz.: Cracow, Budapest, Düsseldorf, and Stüttgart, while in Great Britain, Twilight Sleep is being used with perfect success in many large maternity hospitals as well as in private practise. Remember this always: others have failed in a few dozen or a few hundred cases; Gauss has succeeded in over five thousand!

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III

My Visits to the British Doctors

BEING tremendously impressed with the fact that even the earliest British reports on Twilight Sleep were records of success, I decided in October, 1914, personally to visit several of the most prominent doctors whose reports I had read with much interest at the library of the British Medical Association.

Travel is difficult in Britain during these troublous war times and no one leaves home unless forced to by business, but I feel most richly repaid for my trip, for I now realize that Twilight Sleep is not merely being experimented with here and there by British physicians, but I know it to be a permanently established institution in the British Isles.

I am so tempted to tell you of the hundreds of British wounded I saw being brought into the infirmary at Edinburgh, of the sixteen searchlights playing on the North Sea from the forts under the Forth Bridge as our darkened train sped across, of the hotel full of officers at Dundee (I was the

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only woman there), of the three carloads of Belgian wounded with whom I traveled from London to Bristol, of seeing the poor survivors of the *Hawke* brought into Aberdeen, of the cartloads of little Belgian children going through the London streets, but I must remember I am not writing of war and disaster, but of life and hope for mothers, and restrain myself.

There is, however, one thing which I *can* tell you — one night I was groping about darkened Edinburgh (we expected a Zeppelin raid nightly) and I suddenly noticed a dim street light glinting on a brass plate on a house just in front of me; I walked up to read: "Sir James Simpson"— the house of the man who first relieved woman's pain in labor! It was a coincidence of a really thrilling quality. How curious that I should stumble across the old home of the pioneer of painless childbirth! I thought of the vast strides which medical science had made since that first delivery of Queen Victoria's and of how glad Sir James Simpson would have been to know that his dream of woman's relief in childbirth had come true at last — nowhere is it more of a reality than in Edinburgh itself.

No man in Britain has a more enviable professional standing than Sir John Halliday Croom, Pro-

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fessor of Midwifery in the University of Edinburgh.

The fact that Sir Halliday Croom has employed the scopolamin-morphin method both in the maternity hospital and his private practise in Edinburgh since 1908, is alone sufficient guarantee to all mothers of the safety and efficacy of Twilight Sleep. Although Sir Halliday Croom has been a lecturer in the University of Edinburgh for over thirty years, he is in the very prime of life and one feels that the zenith of his power is not yet reached. With this great obstetrician on our side, the mothers may well feel assured that their battle for the general adoption of painless childbirth will eventually be won.

"Am I justified in assuring the mothers that this method is without danger to their babies?" I asked.

Sir Halliday Croom replied without a moment's hesitation:

"Yes. When properly used scopolamin-morphin is absolutely without danger to the child. If the child is born sleepy, it is the fault of the manner of dosage, not of the method."

He added that when the child is born intoxicated the inexperienced physician often employs violent means of restoration, which does far more harm than good.

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A good maxim for the treatment of sleepy babies is, "Let them alone and they'll come to."

I was not surprised to find that Sir Halliday Croom welcomes this crusade of mothers for painless childbirth, for he is such a great man in every sense. He feels that the scopolamin-morphin method should be more known, more generally adopted, and it should be written about so that mothers may have an opportunity of knowing that there is a safe method which can insure them relief from suffering. He told me with great delight that only two weeks before he had received a letter from a man in Johannesburg, Africa, who is engaged in writing just such a book as this for mothers and he said, "I'm glad the matter is being given publicity; the women should know."

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Sir Halliday Croom does not believe in the advantage of pain; he thinks it is to be deplored that women have had to suffer unrelieved agony in childbirth for so long. He added feelingly: "No *man* wants to suffer if he can help it. It is absurd not to avail ourselves of the wonderful developments of medical science and use every means to prevent suffering." He went on to say that, of course, scopolamin-morphin needs careful handling, just as chloroform or any other anesthetic does. There is the

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same general prejudice against scopolamin to-day which originally greeted chloroform.

He told of the first case of chloroform narcosis in the Edinburgh hospital, the patient died — might have dropped dead in the street anyway and probably had a bad heart — but the death was of course attributed solely to chloroform and the consequent prejudice against its further use was only gradually overcome. Sir Halliday has long employed scopolamin-morphin with perfect success in private practise, and he finds it entirely unnecessary to keep the mother under constant supervision. He leaves a competent nurse in charge, and is always within reach by telephone. "The old-fashioned idea that a practitioner must sit beside a woman during the entire period of labor was outrageous — indecent!" He finds that the mothers have less exhaustion after the judicious use of scopolamin-morphin than without, but of course much depends on the nature of the labor.

He does not believe in early rising and cannot see what object is attained by it. Most women, under the circumstances, are only too grateful and thankful to have a rest. If it be amongst the poor, a rest is the best thing for them; if among the rich, a rest from the rounds of gaiety and pleasure is ex-

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cellent for them. The plan of early rising has been tried in Edinburgh, but Sir Halliday Croom has never countenanced it in his service, for he could not bring himself to believe that women wanted it or that it was of any especial advantage to them. As I had noticed that he referred in his report to a tendency sometimes to after-birth hemorrhage, I inquired if he really considered this a drawback to the method. He replied that he had only had such cases reported to him; personally he had never seen a case of *post partum* (after birth) hemorrhage caused by scopolamin-morphin. He does not find that these drugs prolong the birth process.

Sir Halliday Croom considers the amnesia (or forgetfulness of pain) the most remarkable feature of Twilight Sleep. He has also observed a curious abstract, extraneous sense of pain in some patients. One of his patients on being asked if she felt any pain replied: "I am perfectly comfortable, but some one in the next room is suffering." "The secret of success in the use of scopolamin-morphin," said Sir Halliday, "lies in not giving the first injection too early in the first stage of labor or too late in the second period."

"This can easily be learned by experience, I suppose?"

"By common sense," he corrected.

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"Do you think the Germans have carried the use of scopolamin-morphin to greater perfection than others?"

"No"—the tone was emphatic. "Nowhere have these drugs been employed with greater skill and success than right here by the British doctors."

"Do you think the method will be still further developed?"

"We can't go very much further, can we? What more do we need?" asked Sir Halliday; then he added what should go on record as the final word of reassurance as to the value of Twilight Sleep:

"With the proper use of scopolamin-morphin we can insure painlessness in childbirth without danger to either the mother or her child. A method which does this has, I should say, practically reached perfection."

In Dundee I saw Dr. Robert Cochrane Buist. Dr. Buist had read a paper before the meeting of the British Medical Association held at Sheffield in 1908. It was interesting to find that not only was he continuing the use of the method in the maternity department of the Dundee Royal Infirmary, but he tells me both he and several other doctors are employing scopolamin-morphin in general practise with success. Under the conditions of the work at

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the Dundee Maternity it has not been found possible to continue a systematic record in a manner suitable for detailed report, but as Dr. Buist has, since 1907, employed scopolamin-morphin in all cases where the labor becomes distressing (unless this is within an expected two or three hours of delivery), the accumulated number of cases must now be very great.

Dr. Buist, I'm sorry to say, is not at all in sympathy with the efforts of mothers to bring about the general adoption of this method of painless childbirth. He thinks the mothers should leave this matter entirely to the decision of the medical practitioners. He says the field of experiments is gradually widening and sufficient publicity is being given the matter by the doctors themselves. After Dr. Buist read his report on sixty-five cases at Sheffield, many other doctors present at the meeting made subsequent experiments and their experiments will naturally lead in turn to others.

In spite of this undoubted gradual growth of the method, I pointed out the still existing general ignorance of mothers on the subject. I have not found one mother in a thousand in either England or Scotland who has ever even heard of this method. Should they not be given a chance to know that they need not continue to suffer in childbirth?

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The suffering of women in labor had been greatly overstated, said Dr. Buist, especially by the Germans. Only hysterical or high-strung women needed relief in childbirth and then, when it came to a question of relieving the pain, " the selection of an anesthetic should be left entirely to the judgment of the doctor attending."

In an earlier generation it was the fashion to keep women in total ignorance of all physiological facts; it was even considered indelicate for a woman to make any inquiries about the construction and functions of her body. It is only within the past thirty years that women have been permitted to state openly that they possess *legs* — our poor mothers walked around on two mysterious things known modestly as " limbs."

Left in darkness by our parents about the beautiful truths of our body and the miraculous workings of nature within us, whereby creation was continued, the only information which we ever attained was gotten through vulgar channels, and that false knowledge was so tainted by obscenity that it bore no likeness whatever to the sacred beauty of the truths of life.

In the old-fashioned days when women were merely the blindfolded guardians of the power of childbearing, they had no choice but to trust them-

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selves without question in the hands of the all-wise physician, but that day is past and will return no more. Women have torn away the bandages of false modesty, they are no longer ashamed of their bodies, they want to know all the wondrous workings of nature, and they demand that they be taught how best to safeguard themselves as wives and mothers.

When it comes to the supreme function of childbearing, every woman should certainly have the choice of saying how she will have that child. If chloroform is unsatisfactory and even dangerous in childbirth, a mother should have the privilege of requesting that it be not used. If scopolamin-morphin is safe and insures amnesia, a mother should have the right to demand that her physician employ these drugs, and if he declines to do so she should feel no hesitation whatever in seeking another doctor who will.

As much as I differ from Dr. Buist on the point of the mother's subjection to the doctor, I can only feel admiration for his splendid contribution to the relief of women by his constant use of scopolamin-morphin during the past seven years. He finds the only thing necessary to make the method a success in private practise is the employment of capable nurses to carry out instructions. In general, Dr.

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Buist believes in early rising, and he finds that patients treated with scopolamin-morphin are in a condition where early rising is not injurious. He has never observed any tendency to after-birth hemorrhage.

As for the children, they are only affected when the first injection is given within four hours of the birth. If the children show any signs of intoxication he employs artificial means of restoration, but he added that he believes that "probably more trouble is taken than is really necessary."

The Royal Infirmary of Dundee is a magnificent building looking much more like an imagined castle than the real castle which lies just below it — now used as a barracks for the soldiers (formerly the headquarters of the suffragettes). The Maternity — a pleasant, red brick building immediately behind the main Infirmary — overlooks, from the heights on which it is located, the city of Dundee. The war has claimed many of the Dundee Maternity's doctors and they are at present rather short-handed, but I cannot imagine a more pleasant spot where mothers may go for their lying-in, especially when we realize that the Dundee doctors are not mere experimenters with the method of Twilight Sleep but they are men who have already had years of experience with the use of scopolamin-morphin.

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Twilight Sleep is now a part of the regular hospital routine in Dundee.

Every woman physician whom I've ever met has been altogether adorable. The very fact that a woman undertakes the study of medicine indicates a great core of sympathy with suffering and an overwhelming desire to serve humanity. This is more essentially true of a woman doctor than a man, for woman's nature makes her peculiarly sensitive, and one cannot but realize all that a woman must overcome within herself when she takes up the study of medicine.

Dr. Constance Long is one of the most sympathetic doctors whom I've ever met and I was not surprised to find that without any actual training in the method of Twilight Sleep, her intense desire to relieve women's agony in childbirth led her to read everything which she could find on the subject and then she just forged ahead and made her own experiments. Dr. Long is the president of the British Association of Registered Medical Women, and at a meeting held on the 7th of January, 1913, she read a most interesting paper on her use of scopolamin-morphin in private practise.

I am filled with gratitude to Dr. Long for her sympathetic willingness to give me any information

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which would be of service to mothers in their battle for painless childbirth. She has always believed in diminishing pain wherever it is possible, especially women's pain, and she, like Sir Halliday Croom, thinks all women should be given every chance to know that there is this method of painless childbirth.

As so many Continental obstetricians still lay stress on the fact that Twilight Sleep is not practical in private practise, I was particularly anxious to find out the secret of Dr. Long's success with it in this field.

"It consists in the employment of reliable nurses with whom one can entrust the patient after the first injection," said Dr. Long. She employs the Gauss memory test and calculates her dosage accordingly. The constant presence of the doctor is not at all necessary. The nurses often say they cannot see that the patient is in a condition differing in any way from the ordinary state of women in labor, and they are perfectly amazed to hear the mothers afterward declare that they recall nothing of the process of birth after a certain period — indicating when the injections began to take effect.

In spite of the normal appearance of the patient, Dr. Long always impresses the nurse with the fact that she must regard the patient-mother as under an

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anesthetic and accordingly keep the closest watch upon her. The patient is made to lie on her side, so there is no danger of the tongue falling backward. Though under the effect of the drugs, the mother is able to get up and attend to her bodily excretions as well as eat her meals regularly during prolonged labor.

I asked Dr. Long if she believed in the custom of early rising, and she replied:

"No. It is often the only chance in life the poor things have for an absolute rest." She generally keeps her patients in bed for about two weeks.

All of Dr. Long's Twilight Sleep cases have been *primiparæ* — women bearing their first child — and she has found that these mothers have absolutely no fear of future births, while on the other hand, where women have been delivered without Twilight Sleep and have suffered accordingly, she has often heard them say, "Never again." Dr. Long has had only one case in which the child was born sleepy. She declares she does not feel there is the slightest danger for the child in the method, and she has moreover never seen a case where she felt any alarm for the mother. She has known many instances where the mother simply could not have endured the birth without scopolamin-morphin.

In one case of very protracted labor, because of the

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patient's small, round pelvis, the mother would have suffered unspeakable torture without Twilight Sleep, but as a result of the use of scopolamin-morphin the woman retained no memory of the fearful ordeal through which she had passed.

Dr. Long's last words to me were memorable and, coming from a doctor, peculiarly impressive.

" Only when women demand and *demand* that the doctors adopt this method will the doctors have to give in and meet the demand."

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IV

To Mothers

I WAS greatly puzzled to know how to present this subject to the mothers so that they might be placed in a position whereby they could make statements based on positive knowledge, instead of having to ask questions of their doctors. I know men as a rule have an idea that women can neither cope with nor find interest in technical figures and facts, but personally I regard this as a masculine injustice to the feminine mind.

Where a woman is really interested in a subject that is of vital importance to her sex, she will take infinite trouble to gain the necessary information. In every woman lie the latent qualities of the student. Think of woman's capacity to study the details of housewifery, of domestic economy, of the care of children! Almost every woman in the world is an authority on all that is relative to her daily life.

When it comes to anything as vital as painless childbirth, I do not think I am deluded when I believe that all mothers will be just as keenly interested

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in the subject from a scientific and medical point of view as the doctors themselves.

Unless we mothers do study Twilight Sleep from the very beginning, following its development, the medical experiments, the failures and the successes, we can be in no position to decide whether we desire this method for ourselves and our fellow-mothers, and we shall be unprepared to argue the matter with authority if we wish to urge a general adoption of painless childbirth by the entire medical profession.

Moreover, I have felt the great necessity of making this book technically irreproachable. Should any mother wish to show this volume to her doctor she must feel confident that she is not showing him a book based merely on mothers' experiences and testimony, or on the personal and weightless enthusiasm of the author; she must know that this book contains all the voiced and written opinions on Twilight Sleep of the doctors themselves. Unless we study the records of those physicians who have made experiments with scopolamin-morphin we shall be neither in a position to make correct statements ourselves nor to refute false statements of others based on their ignorance of facts.

When I began to study Twilight Sleep I rather dreaded the technical difficulties of the subject, but

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the longer I have worked over the medical reports the more keenly interested have I become; I am now hoping that my experience may be indicative of the interest which may develop in the minds of other mothers after they have determined not to be satisfied with superficial information on the subject. We can't afford to be superficially informed where the bringing of children into the world and the safety of the mothers and the babies is concerned.

I remember being almost terrified at first by the apparent alarmingness of Dr. Hocheisen's experience with scopolamin-morphin. I then carefully studied Dr. Gauss's directions for producing Dämmerschlaf and reread the Hocheisen report and I soon saw how far afield Hocheisen had gone from the Gauss instructions, and I realized that the fault of the failure lay entirely with Hocheisen, not with the method at all.

Suppose a doctor should say to you: "Don't talk to me about Twilight Sleep! Scopolamin is a dangerous poison and mothers treated with scopolamin-morphin always have hemorrhage, while the children are born intoxicated." If uninformed, you would probably be so terrified you would drop the thought of ever trying Twilight Sleep yourself and warn all other mothers against it. But suppose you were familiar with the papers of Dr.

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Twilight-Sleep children of Herr Hensler, possessor of the only house, hotel and postoffice of Posthalde in the Black Forest

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Gauss, the American report of Dr. Birchmore, the record of Sir Halliday Croom and all the others contained in this book, you would not be alarmed or influenced in the slightest, for you would instantly realize that the doctor who utters a wholesale rejection and damnation of Twilight Sleep either knows nothing of the method from personal experience or else he speaks from personal failure caused by his own faulty technic.

Every mother should be thoroughly conversant with all the experiments which have been made with scopolamin-morphin in order to safeguard herself from being misled or alarmed. Knowledge is not only the most impressive thing in the world; it is the most powerful. I remember once hearing a Bermudian lady make an incorrect statement about the origin of the sago palm. A dear old gentleman gently corrected her. The lady disputed him and with some ire reiterated her first statement, not realizing that the man who had corrected her was a great natural scientist. He turned his wonderful, wise old eyes upon her and said:

"Madame, *I know.*"

I have never heard anything in my life that sounded so convincing as those two short words. What a wonderful thing it is really to *know!* After you have followed the history of painless

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childbirth from its faulty beginning to its present perfection, if the subject of Twilight Sleep is to be considered, you will not be making incorrect statements or asking questions of others; you will be in a position to say, "I know."

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V

Gauss's First Publication on Twilight Sleep

THE ORIGIN AND EARLY USE OF SCOPOLAMIN

IN pursuing the study of scopolamin one finds that the discovery of its chemical qualities was made in Germany, and Germany has remained the nursery of scopolamin up to the present time. It has been in that small corner of Germany known as Baden that all the most important investigations of scopolamin have been made, and the final development of its use in obstetrical narcosis was made at the Ludwig Albrecht University of Freiburg in Baden.

To find the actual début of scopolamin we must go back to the year 1880, when Ladenburg found that the seed of a plant called *Hyoscyamus niger,* growing in all the waste places of Europe, Siberia, Caucasus, and Judea, contained besides hyoscyanin a second alkaloid which he called hyoscin. Ten years later, in 1890, Schmit experimenting with the

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roots of *Hyoscyamus niger* procured the same crystals obtained by Ladenburg, and to these he gave the name of " scopolamin."

The first pharmacological studies of scopolamin were made by Kobert and his disciples, and after many experiments a decision was reached that hyoscin and scopolamin were one and the same chemical.

Since the beginning of the nineties, scopolamin has been largely used by the alienists and the eye specialists; the latter employed it for the same purpose for which atropin had been used. It was found that it could be used for a longer time than atropin, had about five times the strength, and was without disagreeable side effects.

Schneiderlin was the first alienist to experiment with scopolamin; these experiments were conducted in the insane asylum of Emmendingen near Freiburg. He found it of inestimable value on account of its hypnotic quality in calming maniacal patients. Bumke, a later alienist of Freiburg, found that scopolamin had no injurious effect on the spine, its effects being confined largely to the brain; by its use the motor excitability of the insane patients could be diminished because of the drug's weakening effect on the central function of the brain.

Steffen of the Royal Frauenklinik of Dresden,

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however, has been a severe critic of the use of scopolamin in insanity, saying: "In the case of incurable insanity it may be administered, but as long as there is any hope to effect a cure, take care not to spoil the hope."

It is still used in the insane clinic of Freiburg, in both curable and incurable cases, as a sedative for excitability of body, in the small hypodermic injections of .0001 or .0005 g.; larger doses are not avoided because of considered danger, but because the smaller dose has been found effective.

Schneiderlin was so encouraged by the use of scopolamin upon the insane that he began experiments in 1900 with its use in surgery, with what he reported as success.

Von Steinbüchel in 1903 then made the first attempt to use scopolamin for the reduction of pain in childbirth, aiming only to obtain a state of hypalgesia [1] with a hypodermic dose of .0003–.0004 g.[2] scopolamin + .01 g. morphin. In his twenty cases Steinbüchel found a lessening of pain, no loss of consciousness, no weakening of labor, no intoxication of child.

[1] Dr. Krönig's definition of hypalgesia is: "A state in which the patient is still fully conscious and the events and sufferings at birth act upon her with more or less diminished strength."

[2] g for gram. 1 gram = 15.432 grains.

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The next reports were from Wartapetian, who found that in fifty per cent. of new born infants under scopolamin-morphin there was a state of deep asphyxia, but in the mothers he found no danger or diminution of labor. His experiments were followed by those of Reining, who had practically the same result, with an added observation of delay in the birth process. Following these were publications by Pankart, Zeffer, Weingarten, and Pisarzewski, the latter two being very favorable. Weingarten found besides the lessening of suffering that scopolamin regulated the labor, and the birth process was accelerated. Newell and Puschnig observed a disposition of the uterus to relax.

While the opinion about the value of scopolamin in therapeutics was decidedly favorable, many critics now arose condemning the drug as extremely dangerous, scopolamin being at that time subject to great variability. To clear up the differences of opinion on the subject of its variability and physiological effect, the Pharmacological Institute at Jena made extended experiments to ascertain the effect of scopolamin on the animal organism. It was found to increase the pulse of cats and dogs. After the heart of a frog had been deadened it was revived by scopolamin. The drug caused at first an increase

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of the blood pressure, which however soon subsided, often sinking below the normal. Frogs placed on their backs and given an injection of scopolamin remained in that position with a weakened heart. Rabbits were extremely agitated after an injection of only .01 g. and had slow respiration. Dogs after an injection of .05 and .01 g. showed only a slight increase in the blood pressure.

Later on (in 1909), C. M. Nicholson at the American Medical Association at Chicago made known his results in experiments on various animals with scopolamin. Repeated injections caused no degeneration of heart, liver, or kidneys. As long as feeding was not interfered with, repeated injections did not influence the physical condition of animals. When a fatal dose was given, death was found to have been caused by congestion of the intestines.

Sohrt and Bumke (to return to our earlier date), made experiments on themselves in order to ascertain the effect on the human body and the mind, and reported that after ten minutes they entered a state of irresistible drowsiness with heaviness of eyelids and a sensation of thirst; this condition was succeeded by quiet, firm sleep. Klinke gave himself a dose of ¾ mg. scopolamin and enjoyed frightful hallucinations and illusions.

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THE FIRST GREAT EXPERIMENTS WITH SCOPOLAMIN IN OBSTETRICS

The interest, however, of all German medical faculties was not concentrated on the use of this alkaloid in obstetrics until the experiments of Dr. Krönig and his assistant Gauss were in progress in the delivery wards of the Freiburg Frauenklinik. Krönig had earlier begun investigations of the scopolamin-morphin narcosis while at the University of Jena in Saxe-Weimar, but these were taken up on a much larger scale at Freiburg.

When Gauss made his first report on the use of scopolamin-morphin in childbirth, only four other clinics had at that time followed von Steinbüchel's example at his clinic at Graz, in adopting scopolamin-morphin narcosis for diminishing the pain of delivery, viz.: Jena, Giessen, Budapest, and Klagenfurt, and the results of only 225 cases had been published.

To these Gauss was then able to add reports on 500 cases conducted by him in the Freiburg Frauenklinik confinement wards.

WHAT IS NORMAL LABOR?

In presenting his report, which was entirely unique, Gauss first remarked that it was a most

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singular fact that the greatest opposition to the use of any narcotic in childbirth had come from the Church. The second and less violent opposition had arisen in the medical profession from men who asked: "Is it justifiable to lessen by narcotics the suffering of a woman in perfectly normal labor?" Others had urged that the labor pains were physiological and that no one had a right to interfere with the normal course of natural phenomena. Pursuing the subject, Gauss asks:[3] "But what is physiological, what is normal? Granted that a physically and psychically healthy woman of childbearing age can survive the physiological pain of a normal birth by summoning all her bodily and mental vigor without injury to her body and mind — an older woman, bearing for the first time, whose soft parts offer a many times stronger resistance to an enlargement — a rachitical[4] woman, whose pelvis requires an especial birth process and abnormal labor to render a spontaneous birth possible — a woman in labor with generally narrow pelvis in whom the physiological pain of pressure and contusion is still further increased in addition to the protracted pathological course of the birth — is it cor-

[3] "Childbirths in Artificial Dämmerschlaf," by Dr. Carl J. Gauss. *Archiv fur Gynecology*, Vol. 78.

[4] Affected with rickets.

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rect to talk also in these instances about the physiological pain as a natural phenomenon?"

THE REQUIREMENTS DEMANDED OF SCOPOLAMIN-MORPHIN

Gauss considered that the requirements of a perfectly successful narcotic were: a reduction in the pain of the mother to a degree that should be perceptible to her as well as to the attendant physician; there should be no disagreeable secondary effects, or, if any, they should not be injurious to the mother and their strength should not be out of proportion to the degree of alleviation of pain; there should be no attendant nausea or disturbance of the subjective state of the health of the mother; the progress of the birth should not be affected by an interference with the muscular action, the bearing down of the after-pain, or the functions when nursing and in puerperal involution; furthermore the child should not be injured during intra-uterine life or extra-uterine life either at the beginning of its life functions or in the course of its first weeks of life or later development.

With these high requirements in view he began working very cautiously with the, as yet little understood, combination of morphin and scopolamin. At first he only gave injections when he deemed that a birth could at any time be terminated by an in-

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nocuous operation should either mother or child show injurious effects from the narcosis. In choosing his first cases Gauss did not experiment with any patients showing disposition to complications due to narrow pelvis, placenta previa,[5] or habitual disturbance of the placental period.

THE FIRST EFFECT OF THE INJECTIONS

In describing the effect of the injections upon the mothers, Gauss says: "The majority of the patients impress one as being very sleepy, but otherwise quite normal. Every pain is accompanied by clearly perceptible if often only slight expressions of suffering. The pains and the accompanying sufferings are referred to and felt clearly as such. Every question is perhaps sleepily but nevertheless clearly answered.

"In this stage nothing beyond the very pronounced weariness of the patient strikes the layman or even a medical man who is unaware that an injection has been given. So much more astonishing is it subsequently to learn that the patient, whom one believed to be completely conscious has, after the birth, not the slightest idea of what she has just gone through, or of the conversation held with her."

[5] Presentation of the afterbirth before the child.

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ORIGIN OF THE TERM "DÄMMERSCHLAF"

"Taking into consideration the principal symptoms of this intentionally produced and peculiar condition, and also the difference in principle between it and the conditions of semi-narcosis, I consider myself entitled to speak of my method as an artificial 'Dämmerschlaf' or a condition of *Twilight Sleep.*"

To achieve such a Dämmerschlaf requires a trained staff and a constant supervision by a doctor.

In semi-narcosis the perception of pain in the brain is hardly disturbed, but in consequence of scopolamin narcotization the centers of perception are so stupefied that apperception [6] of pain does not take place. In the first state of hypalgesia the patient is still fully conscious, in the later state of apathetic unconsciousness, the patient reacts unwillingly or not at all — there are no sense impressions and the physiological reflections are extinguished.

Between the capacity to perceive and observe, and a complete narcosis is a half-way house, and it is to this half-way house that Gauss gave the now famous name of "Dämmerschlaf."

Of this condition he says: "I have often seen

[6] That kind of perception in which the mind is conscious of the act of perceiving.

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the patient, after the last and successful ejection pain, sink back on the pillows with the sigh of relief: 'Thank God, that is over with.' She had undoubtedly at the moment a clear perception of the birth which had taken place, and took also the greatest interest in the child, its sex, state of health, and crying. If, however, she were asked about ten or twenty minutes later some such question as, When her child was coming? she would reply that she didn't know, or that it wouldn't be much longer, or some other similar answer, showing that the fact of birth having taken place, although perfectly perceived, had yet not been included in the storehouse of memory. In other words — as the alienists say — it had been perceived but not apperceived."

THE NERVOUS SYSTEM AND CHILDBIRTH

"The fact that there is absolutely no memory of the exertions which, toward the end of the birth, become more and more frequent and intense, does away with that condition of mental exhaustion that we so frequently observe in protracted births.

"It is well known how seriously the nervous system of a woman is or may be affected by a difficult birth which demands the exertion of the last remnant of her mental and bodily strength, and that such a birth, if a corresponding tendency already

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exists, might possibly give rise to a severe nervous exhaustion in which the memory of the terrors of childbearing, and a fear of a repetition of them, may reduce a woman's capacity and embitter her whole life.

"The army of suffering women who, although exhibiting no sign of definite disease of the organs of generation, yet go to consult the gynecologist because they attribute their general nervous complaints (caused by the memories of childbearing) to this region, shows emphatically how extremely injurious to the nervous system a painful birth may be in an organism disposed to nervous weakness. How many women show an exhaustion and lassitude for days after an ordinary birth. It is perhaps due to the avoidance of this state of exhaustion that the women delivered under the influence of scopolamin-morphin almost always pass the first night after birth in a deep refreshing sleep which many women delivered in the ordinary manner cannot obtain although greatly in need of it.

"The statement has often been made to me that a patient has never been so comfortable after a birth; I have also often repeatedly made the observation that the women, in consequence of their loss of memory, believe that they have only been in labor for about a third of the real time; these facts

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can only confirm me in the belief that in the Dämmerschlaf we have efficacious means of doing away with the nervous sequelæ of childbirth."

DETERMINING THE DOSE

"The dosage is naturally entirely different from that employed in surgery.

"In the first place, a woman in childbirth is in any case much more susceptible than usual to all narcotics, so that very small doses will suffice to produce the desired effect. In the second place, it is far from our intention to attain a deep narcosis; we must, on the contrary, avoid this, as we insist on a condition in which the group of muscles which play the most important part in the work of birth — those which produce the straining action — shall retain their effectiveness, not only as regards their voluntary but also their involuntary action.

"The object to be attained by the use of scopolamin-morphin Dämmerschlaf in obstetrics is, in fact, nothing beyond a reduction of suffering, and that slight degree of clouding of the consciousness in which impressions are not apperceived by the patient.

"It is obvious that the dosage employed by me for the injections during all the period embraced by these five hundred births has not remained the

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same as that at first employed, as I, of course, in the first attempts went to work very cautiously and therefore had frequent failures because of the small doses initially employed. Encouraged, however, by my first successes, but not yet satisfied with the results, I then tried larger doses and found that in most cases the stage of Dämmerschlaf could be reached, and that in as short a time as one desired. But to produce this condition in a short time we had to pay the price of unpleasant accessory symptoms and these I wished to avoid.

"The use of scopolamin alone did not appear advisable, since, as has already been observed by alienists and pharmacologists, it occasions in many persons a condition of excitement. It seemed best therefore to use in addition to the scopolamin a sufficient but not too large quantity of morphin, so that the unpleasant attendant effects, whether of morphin or scopolamin, could be avoided without a diminution of the narcotic action."

After experimenting with the chemical in varying forms, age, origin, and manner of preparation, Gauss found that the powder supplied by Merck, St. Margarethan, and the tabloids from Boroughs Wellcome were the most reliable to be gotten at that time.[7] After further experimentation he decided

[7] The invariable scopolamin of Professor Straub, known as

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that it was best to use *separate* solutions prepared by a pharmaceutical chemist .03 per cent. solution of crystal scopolamin hydrobromic in sterilized distilled water and a one per cent. morphin muriaticum solution. As soon as the preparation showed signs of flakiness it was thrown away. The solution was kept in a dark, cool place.

The variability in the effect of the drug he believed at that time to be largely due to the varying susceptibility of different constitutions to scopolamin, and also the varying susceptibility of the same individual at different times to the same amount of injection. He found that the weight of mothers had something to do with the effect of the drug — tall, massively built women requiring a larger dose than short or slender ones. All organisms which had been deteriorated by illness, exhaustion, or anemia reacted in a greater extent to scopolamin-morphin. The habitual use of the alkaloid on patients made no difference in the action of the drug.

THE AMOUNT OF SCOPOLAMIN-MORPHIN FOUND TO BE SUFFICIENT

In order to feel his way, he preferred to make the initial injection a little too scanty rather than over-

"Scopolia Haltbar," now used exclusively at the Frauenklinik, will be told of later on.

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generous. Beginning with a dose of .00045 g. to .0006 g. scopolamin hydrobromic + .01 g. morphin, he found that in the case of average constitutions and susceptibility a good effect was obtained in from three-quarters of an hour to three hours. The scopolamin and morphin was used in separate solutions. If the desired effect was not then reached, a second injection of .00015 to .0003 g. scopolamin without morphin was given, which generally took effect in from a quarter of an hour to half an hour. The third injection was suited entirely to the condition of the patient. If the patient had in the course of from two to four hours regained entire consciousness a repetition of the same second small dose with .005 g. morphin muriaticum added was found to be sufficient.[8] With this method of dosing Gauss found it possible to maintain a semi-narcosis extending over several days, if necessary, without injurious consequences. The largest total dose administered (extending over a period of forty-seven hours) was .00315 g. scopolamin to .025 g. morphin; in another case, extending over thirty-six hours, .0036 g. scopolamin was given alone.

[8] "The syringe used should be sterilized shortly before use and be as far as possible freed from the disinfecting liquid, as otherwise contamination of the solution cannot be avoided; during the course of the birth the syringe must be kept in absolute alcohol in a glass vessel."— *Gauss.*

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In a later case (which has been severely criticized by several obstetricians) Gauss kept a patient of thirty-six years of age bearing her first child, fifty-seven hours under scopolamin-morphin, and eventually accomplished a spontaneous birth in spite of the soft parts of the mother being rigid; there was a premature bursting of the membrane and the child was abnormally large. The mother retained no memory of her entire childbed, and the child was born active and lusty. Of this case Steffen says: "To keep a patient fifty-seven hours under narcosis made a total dose of .00375 g. scopolamin + .03 g. morphin. We have not the courage."

INDICATIONS OF THE DEPTH OF NARCOSIS

"The problem of maintaining the uninterrupted action of scopolamin-morphin," says Gauss, "is more difficult than that of inducing it. The most obvious way would be to deduce the narcotic action from the signs of pain shown by the patient. But these exhibitions of pain only cease entirely in a very small proportion of the cases, and besides this they also increase physiologically, even in Dämmerschlaf, toward the end of the birth, so that for these reasons they afford no reliable clues to the extent to which the consciousness is clouded.

"The dilatation of the pupils of the eye in re-

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sponse to bodily pain takes place, as I was able regularly to ascertain, also in response to a birth pain, and is greater the more acutely the patient is conscious of the sensation of pain. The pupils of some patients become greatly dilated in consequence of the preponderation of the action of the scopolamin." Gauss concludes that the action of the pupillary reflexes cannot be regarded as an absolute indication of the extent to which consciousness has lapsed. Neither can coordination be counted on as a safe test.

"As the Dämmerschlaf begins, the locomotor coordination becomes worse and worse, and when the narcotic action has reached its highest point it is almost entirely absent."

ORIGIN OF THE "MEMORY TEST"

It is of great importance to follow Gauss carefully on the subject of consciousness and memory, because it is necessary to have a perfect understanding of the basis of his memory test in order to appreciate his reasons for adopting this test as the guide to dosage. Moreover, the importance of the memory test as a criterion is proven by the fact that many of the failures of other obstetricians with the Dämmerschlaf can be traced to the fact that the memory test was not strictly observed and conse-

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quent relative overdosing of patients followed.

"After trying all sorts of things," says Gauss, "I was put on the right track by considerations of the views current amongst alienists. The stage of scopolamin-morphin action which we wish to attain is only a *derangement* of the consciousness.

"What we term consciousness is the sum total of the simultaneous mental processes into which internal and external stimuli are transformed. Derangements of the consciousness are consequently pathological deviations from the regular course of these mental processes which can exhibit various degrees of clearness according to the magnitude of the liminal value.

"Weakness of memory consists of a diminution or loss of the capacity for remembering past impressions; derangement of the perception is characterized by limitation of the formation of new memory pictures or images. In the amnesia produced by scopolamin-morphin the retention of already formed memory-pictures and concepts is not affected, but only the formation of new ones. It must consequently be also conversely possible, by testing the capacity of perception, to arrive at conclusions as to the subsequently appearing forgetfulness and so as to the intensity of the action of the drug at the moment.

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"My expectations of the truth of this theory were confirmed by my experiments.

"Since that time I have guided myself as to the dosing almost altogether according to the variations of the carefully tested capacity of apperception and have, when these tests have been properly carried out, never been misled."

For the successful attainment and maintenance of Dämmerschlaf, Gauss has insisted (from the time of this first published report on 500 cases up to the last published report on 3,000, and now verbally after experience in over 6,000 cases) that there is but *one* guide for the physician — the "memory test." This memory test has also been subjected to much criticism by his opponents, Steffen of Dresden, Bumm and Hocheisen of Berlin, and Gminder of Essen.

HOW TO CONDUCT THE MEMORY TEST

The very simple method of the memory test, to quote Krönig, is as follows: "No testing of the power of perception begins until half an hour after the second administration of scopolamin-morphin by a subcutaneous injection. Some object is then shown the patient and she is asked to observe it. Some time after it is shown to her again; if she recalls having seen it before, it is considered as an in-

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dication that a third dose of the same quantity as the second is required, as no clouded consciousness has as yet been established. Objects chosen for observation are generally those which have some connection with the process of birth, and are consequently sufficiently well known to patients not to be too striking. Very often a patient is merely catechized on the number of injections which she has had; if she can recall the number it is a proof that no Dämmerschlaf as yet exists. It certainly requires practise and experience to decide how best to test the condition of consciousness of particular patients in accordance with their intelligence. After a state of clouded consciousness has been established no further injection is given until the power of perception in patient recognizes an object shown half an hour previously. In the case of all but the first injection scopolamin alone is generally administered."

Steffen remarks concerning this memory test that, "the power of observation varies much in the wide-awake state of individuals and more so in patients under the variable influence of scopolamin. Entirely dominated by their expectation of an event which will mean joy or sorrow for them they have slight attention to give to objects shown them by the physician, so that their memory of these articles

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disappears rapidly. Probably every one has had the experience that he has heard a question and answered it, while he was actively occupied with something else, so that he recalled only indistinctly the question or forgot it entirely. It is equally difficult for a physician to make correct observations of the memory sense in patients without having had experience as an alienist. It is evident that various observers will arrive at varying quantities and conclusions."

Gauss maintains (and has his undoubted success to support him) that the memory test is simple, reliable, and the only guide to the observer, for the reason that the regularly recurring labor pains cannot be used as tests; they always recur and therefore make each time a more lasting impression on the memory. The complaints of mothers are even less to be counted on as a guide, as they are solely based on the perception not apperception, and after birth, however much complained about at time of occurrence, are not recalled at all. It is also evident that the names of objects shown will accumulate during the course of process and therefore it will become gradually more and more difficult for the doctor to keep his bearings.

In order to control all symptoms correctly they have at the Frauenklinik a so-called " Scopolamin

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Curve" which is filled out from each case by the nurse. This is the form of the curve:

Date:
Time:
Injection (place, quantity, manufacturer of scopolamin, symptoms):
Subjective statements of patients about fatigue, thirst, pain in small of back? in the abdomen? at perineum:
Objective observations about sleep (during intervals between pains, or during pains, twitching of hands, color of face, effect of suffering, consciousness):
Progress of birth: examination, operation, bursting of amnion, the first contraction of abdomen, entering of head, and passing of head):
Pains, how often?
Pains, how long?
Pains, how vigorous?
Heart sounds:
Pulse:
Breathing:
Temperature:

As will be seen, all factors of importance to birth and Dämmerschlaf are considered in this diagram, so that a properly-filled-out diagram is the best proof for correctly observed birth and the dosage, and in the compilations of statistics.

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THE CONSTANT PRESENCE OF THE PHYSICIAN NECESSARY

Gauss insists that an uninterrupted watching of the patient is an unavoidable necessity for the proper maintenance of the Dämmerschlaf and a sufficient, yet uninjurious, dosage. "If this is not done," he says, "the result is either overdosing, in which case unpleasant side effects occur, or in underdosing when as a consequence the Dämmerschlaf is interrupted and the patients retain in their memories events and observations made during isolated lucid intervals in the course of a more or less protracted period of amnesia. The existence of such "memory islands"— as I term them — is extremely injurious to the total effect; the patient connects them with one another by natural trains of thought and so forms for herself a picture of the birth that, precisely because it is based upon isolated but exact observations, gives her so much more the idea of having a genuine recollection of the course of the birth.

"It is clear that the accurate checking of the intensity of the action of scopolamin-morphin will not be so very easy. Curiously enough it is most difficult in the case of extremely demented and of highly intellectual women. Unless the doctor and

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a skilful, well trained and experienced obstetric nurse keep a close observation on the whole course of the birth, nothing but repeated failures are to be looked for in the general results."

PRESERVING THE PATIENT FROM DISTURBING IMPRESSIONS

"The patient should as far as possible be shielded from all stimulation, mental and physical. It is consequently best to have her in a room by herself, where nothing disturbs the quiet beyond the proceedings necessary for the birth. Loud conversations, penetrating noises, the coming and going of relatives — in short, everything that sets the patient's senses to work — should be carefully avoided.

"As we often found the only thing observed by the mother was the crying of the new-born infant, we have now made it a custom to carry the child out of hearing of the mother as quickly as possible.

"We have reduced the stimulation of the sense of hearing by the use of antiphones or balls of cotton wool dipped in oil and put into the ears.

"The sudden turning on of the electric arc light in our obstetric operating room often had a disturbing effect and was sometimes the cause of inopportune awakening, so we now protect the eyes by a dark colored cloth or colored spectacles and

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have found that this greatly facilitates the maintenance of an uninterrupted Dämmerschlaf."

SUBJECTIVE EFFECTS OF SCOPOLAMIN

Among the subjective effects of scopolamin he mentions thirst, which is due to the effect of the drug on the secretions of the mucous membranes.

Gauss says: "I never hesitate to give the patient as much water as she desires and in spite of this I have never seen any injurious results follow. Vomiting is hardly ever observed, unless it has already appeared before the injections are begun."

Among other side effects, derangements of the senses of sight and hearing now and then occur. The patients sometimes answer questions which no one has asked them, and again they will carry on whole conversations with themselves. Mental hallucinations occasionally occur. "But," says Gauss, "these hallucinations only occur in stages of unintentionally profound derangement of the consciousness and as the patient cannot afterwards remember them, they cannot be said to affect her subjective comfort."

EFFECT OF SCOPOLAMIN-MORPHIN ON THE LABOR PAINS

In order to ascertain the effect of scopolamin-morphin on the satisfactory working of the eject-

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ing forces — that is to say, the labor pains and the straining action — Gauss' assistant, Dr. Schlimpert, made what was called a "Birth-pang Curve," based on his exact checking of the pangs by recording and registering them in curves. Schlimpert registered the interval of time between a pang and the previous one and how long each pang lasted. It was found that the higher the "pang mountains," the less the frequency of the pangs; the broader the "mountains," the more powerful the action of the individual pain.

The pains were never judged by the signs of suffering given by the patient but by the contractions observed by the hand of an obstetric nurse kept continuously on the uterus.

Schlimpert's laborious work of observation (128 pang curves) were added to by critical notes made by Gauss and entered at the conclusion of every birth.

Poor young Schlimpert gave his life for this work. For many months he had been suffering from what he recognized as appendicitis, but so interested was he in the Dämmerschlaf and his especial task of helping to prove by his "curves" that scopolamin-morphin did not affect the labor pains unfavorably, he kept the secret of his suffering from all his associates in the clinic; it was not

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until the pain became at last unendurable, did he confess the truth to Krönig and Gauss. It was too late. Dr. Schlimpert survived the operation only a few days, but the courage and beauty of his last days will never be forgotten in the Frauenklinik.

In addition to Schlimpert's work, Gauss also had notes of the pang action in 493 cases. In 103 cases the pangs were excellent, in 273 good, in 36 varying, in 39 bad from the beginning. In 451 births no noticeable affection of labor action by the injections could be detected. In 42 cases an alteration in the pang was observed, in 36 cases they were decidedly improved by the injections, in 8 cases they became worse.

How far the alteration in these last eight cases was due to the drug and how far to chance, Gauss found it very difficult to ascertain.

On the whole, he felt that the result of the "curves" proved there was practically no question of an unfavorable action by the scopolamin-morphin injections on the labor pangs.

"A bystander often observes what he considers a diminution of the power of the pains after the injection, because there is a diminution or cessation of demonstrations of pain on the part of the patient, but by placing the hand on the uterus it is found that the processes of birth are continuing un-

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changed although there may be no outward sign of intense suffering."

According to Schlimpert's calculations there was sometimes an increase of time between the pains, but on these occasions he also observed an increase in the duration of the pangs; furthermore he found that the injections had a clearly recognizable regulative effect on previously irregular labor action. Schlimpert's tables also proved that the reflex straining action in most cases was good.

Gauss says the lesson to be learned from a study of these "curves" is first: not to give too large quantities of scopolamin-morphin at one time. Begin with relatively small doses, then by gradually adding to them you induce the desired action, so to speak, surreptitiously. Larger quantities, administered in a limited time, bring about a more rapid effect, but they also often — though not always — have an undesirable effect on the labor action.

"Secondly: the quantity of morphin introduced into the body must be kept as small as the desired narcotic effect permits."

THE AFTER-BIRTH PERIOD

He found that if there was no appreciable diminution of the pang action during Dämmer-

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schlaf there would be none in the after-birth period either. "Under all circumstances — hemorrhage of course excepted — the spontaneous detachment of the placenta" (after-birth) "is awaited; if the expulsion has not taken place spontaneously it is left to the straining action of the patient or facilitated by gentle pressure on the abdomen, *not* on the uterus."

EFFECT OF SCOPOLAMIN-MORPHIN ON THE MILK SECRETION

Although, as Gauss has pointed out, scopolamin affects the glands and mucous membranes, it has not been found to affect the milk secretion.

As a test of this, statistics were kept of two hundred mothers delivered without scopolamin-morphin and like statistics were kept during the same period of two hundred Dämmerschlaf mothers.

Here is the table:

Without scopolamin.	*With scopolamin.*	
137 = 68.5%	134 = 67%	had large milk supply.
8 = 4%	15 = 7.5%	had insufficient milk supply.
55 = 27.5%	51 = 25.5%	had no milk at all.

DÄMMERSCHLAF AND THE CHILD

As to the effect on the child, Gauss says he is absolutely convinced "of the innocuousness of the

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Dämmerschlaf. This confidence is shown by the rule now invariably followed of beginning the injections as soon as the pains occur at regular intervals and are found to be unpleasantly painful by the patient, without any regard for the stage which the birth may have reached or the complications that may be present."

Of the 506 children born to these 500 mothers, 500 (98.8 per cent.) were born alive and 6 (1.2 per cent.) were stillborn. Of these 500, 316 (62.2 per cent.) were vigorous and lusty; 199 (23.8 per cent.) showed, on the other hand, a condition which indicated that the injections had affected the child's organism.

"OLIGOPNEA"

Gauss had already added the term "Dämmerschlaf" to the medical lexicon; he now added another word to describe the above condition of the child affected by scopolamin — that term is "oligopnea."

It is a condition of intoxication evidenced by the child; after taking a deep breath at the moment of birth with a more or less loud cry it relapses into a motionless condition, the heart action however continuing. It opens its eyes only to close them again as if tired.

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"In my earlier cases," says Gauss, "this condition inspired me with great uneasiness and I considered myself bound immediately to commence measures for resuscitation. Gradually, however, by cautiously delaying my intervention, in suitable cases, I found this anxiety was exaggerated, so I then calmly waited to see whether the child would begin to breathe properly without outside intervention and I found that various infants left alone from fifteen to twenty minutes established regular breathing, the action of respiration becoming more frequent until normal breathing was established."

In cases where it seemed advisable to give the child assistance, it was found that the quickest and surest method of resuscitation was a rhythmic massage of the heart. Often a slight irritation of the child's skin is sufficient to produce regular deep breathing and loud crying.

The effect of artificial resuscitation upon the child, Gauss compares to a fly-wheel which once set in motion is kept indefinitely in motion by small regularly acting forces, which however would not have been sufficient to start it.

He says: "While I do not believe this intoxicated condition harbors any serious dangers to the organism, I have nevertheless tried to avoid it by modifying the dosage. As I applied the first doses

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of scopolamin-morphin without knowledge of the effect to be expected in general, overdosages were unavoidable. Only by degrees I then learnt the objectionable effect of superfluous quantities of morphin which undoubtedly increased the early number of oligopneic children."

Krönig reports that at first they had 20 per cent. oligopneic children, a record which by the year 1908 was reduced to 10 per cent. The mortality of children at the Frauenklinik during or soon after birth has been decreased considerably since the inauguration of the Dämmerschlaf. "We have had, for example," says Krönig, "in the last 500 deliveries under scopolamin, only one child to mourn. For this strikingly low mortality Professor Aschoff has offered perhaps the right explanation, viz.: that the slight narcotization of the respiratory organs during birth, by extremely minute quantities of scopolamin, is advantageous to the child. If the child, in the interruption in the placental supply of oxygen responds by a premature respiratory movement, permanent obstruction of the air passages by inhalation of amniotic fluid[9] with epithelium[10] and vaginal bacteria takes place. If, on the other hand, the child is slightly narcotized by scopolamin

[9] The fluid in the sac directly encircling the unborn child.
[10] The outermost bloodless layer of the mucous membrane.

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it does not immediately respond to the small accumulation of carbonic acid in the blood and the air passages remain free."

LATER STATE OF INFANT'S HEALTH

"From our investigation of the children of private patients, who can easily be kept track of, we have found that within the first year there can be no talk about an injury to the development of the children on account of the employment of scopolamin-morphin."

AFTER-HEALTH OF MOTHER

As for the Dämmerschlaf affecting the later health of the mother, I recall one case of a Freiburg mother, who, six months after having had her first child at the Frauenklinik, had an attack of some slight nervous disorder; her condition was immediately attributed to Twilight Sleep by relatives, friends, and a Freiburg general practitioner. The mother, eventually convinced that scopolamin was to blame, went to see Dr. Krönig about the matter, and this is the reply she received from him:

"As well say you have sneezed in June because you sat in a draft on Christmas Day."

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VI

The Famous Hocheisen-Gauss Controversy

As a result of the sensation produced in the Continental medical world by the publication of this Gauss report, many of the head physicians of the large European hospitals gave orders that the "Gauss Dämmerschlaf" was to be given a trial by their staff. The reports on these experiments published in the German and Austrian medical journals of the following year make very interesting, exciting, amusing, and terrifying literature.

The most important experiment was that conducted at the Berlin Charité by order of Geheimrath Bumm. As Bumm stood virtually at the head of the entire German medical world, his support or condemnation of Twilight Sleep was a matter of tremendous importance.

The results of the experiments at the Berlin Charité were reported upon by Herr Bumm's assistants — Hocheisen and von Bardeleben — at the meeting of the Society for Obstetrical Practise and Gynecology at Berlin in 1906. This was an epoch-

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making meeting, for it was to this meeting that Gauss — then just emerging from his twenties — went to break a lance for his method in the face of an expected tremendous battery of opposition. It was very like a David and Goliath performance — Gauss's David to the triplet Goliath of Bumm, Hocheisen, and von Bardeleben.

The discussion at this meeting has been handed down in the German medical world as the "Hocheisen-Gauss Controversy." Because of the importance still given to this discussion in the German medical publications of to-day, I shall give a detailed account of the reports of Hocheisen and von Bardeleben. There is one peculiarly important feature of both these reports to which I would like to draw your especial attention: neither Hocheisen nor von Bardeleben ever refer in any way, in their reports, to the *memory test.* Yet Gauss had clearly stated it to be the very backbone of his Dämmerschlaf.

Hocheisen's opening words are: "It is surprising to hear scopolamin praised when it is known to be one of the most dangerous of all poisons — a poison incalculable in its action." As Gauss afterwards said, "That theory Hocheisen uses as the motto for his discussion." [1]

[1] *Münchener Med. Wochenschr.*, 1907.

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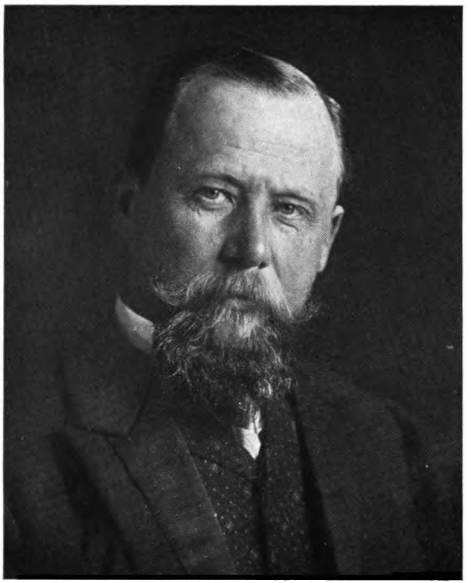
Geheimrath Prof. Dr. Aschoff



Dr. Hoche, a famous nerve specialist, who approves of Twilight Sleep

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"We have treated all told from 120 to 130 cases," says Hocheisen.[2] "One-half of the births were attended by von Bardeleben — the other half by me. I will only report on the last continuous series of 100 cases."

After claiming: "We have always observed the instructions of Gauss," immediately after we find Hocheisen saying: "From the beginning we used smaller doses. We only gave the injection when the head was found to be entering the pelvis. We used little or no morphin." A little further on we find: "The precautionary measure recommended by Gauss of keeping the patients separate could not be followed by us. Patients awaken very easily from the Dämmerschlaf and the slightest noise disturbs them. The seclusion, therefore, is probably recommendable but in practise I believe it will be found very difficult to attain.

"On the whole," Hocheisen acknowledges, "we must state that in a large percentage of patients small doses of scopolamin reduced the suffering. In 70 per cent. there were secondary effects. When falling to sleep the patient gets very red in the face, the redness sometimes increasing to purple. There is a pronounced thirst in 45 per cent. We

[2] From *Münchener Medical Wochenschrift*, No. 37, 1906, and *Ztschr. f. Geburtsh, u. Gynäk*, Stuttgart, 1907.

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had six cases of vomiting. Four patients were so delirious we had to use morphin. In 46 instances labor was not influenced, it was sometimes even stimulated; 21 times it was considerably weakened; 15 times labor was retarded during period of expulsion; 3 times it ceased entirely. In 24 per cent. of the cases we observed a decided influence upon the abdominal action."

We find, therefore, by the above Hocheisen figures that in the majority of cases (46) the labor action was bettered by scopolamin — in 39 instances it was affected unfavorably; that leaves 15 cases out of the hundred on which Hocheisen keeps silent, so one must infer that in these 15 cases labor was not affected either one way or the other. If there was a decided effect on the abdominal action in 24 per cent. of cases, that leaves a majority of 76 cases where the action was not affected.

"In the sixty births observed by me," says Hocheisen, "I have not used the forceps in a single case. Among von Bardeleben's cases the forceps were used six times on account of the condition of the child."

It seems surprising and a bit inconsistent after Hocheisen has said he did not have occasion to use the forceps at all, to find him immediately after making this assertion: "But I believe in practical

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obstetrics, with the use of scopolamin — forceps will have to be employed in from 20 to 25 per cent. of all cases."

From Bumm's data we find him to state that an average birth lasts twelve and one-half hours with a period of expulsion of one hour and three-quarters.

Says Hocheisen: "With our scopolamin cases the expulsion period averaged six hours and fifteen minutes against the normal one hour and three-quarters. The shortest length of birth was fifteen minutes, the longest seventy-nine hours. In some cases the placenta expulsion took three hours.

"Under scopolamin we had 15 per cent. where after nine days the uterus was still the size of a child's head. This is probably no accident, considering the disturbances arising from scopolamin during the placental period."

Hocheisen then gives a very detailed account of the case of a girl of nineteen bearing her first child.

"Before the injections," he says, "I had examined the heart but only superficially I admit. I gave her injections of .0005 g. scopolamin and .01 g. morphin. The patient at once became very restless at each pain, her restlessness increasing to such an extent that after five hours I gave her another injection of .005 g. morphin. The birth occurred

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two hours later without complications. One hour and a half after delivery the patient sat up suddenly in bed and could not get her breath, becoming blue in the face. Her pulse was still 80 — good vigorous beats — but it suddenly rose to 120. There was a complete perturbation of heart. After one hour I gave morphin, whereupon her condition improved, but it was not until late that night that the patient was out of danger. The following day she was in a comparatively good condition."

In one case of pronounced dyspnea (difficult breathing) and a case of violent breast pang Hocheisen lays the charge to scopolamin, though in the last case two similar attacks had already occurred and an examination disclosed an affection of the mitral valve.[8]

"In 20 per cent. of all cases I observed a slackening of pulse and irregularities.

"Gauss says the only counter indications for the use of scopolamin are primary weakness of labor, feverish condition, anemia, and somnolent condition without eclampsia" (convulsions during childbirth). "I would like to add to these counter indications, diseases of the heart and kidneys, and any disarrangement of the respiratory or circulatory system."

[8] The valve of the heart between the left auricle and the left ventricle.

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"What about the child?" asks Hocheisen. "We have had one case of oligopnea which lasted for three-quarters of an hour. Gauss states that this condition passes off spontaneously, only a slight tickling of the skin or heart massage being sufficient for restoration. I do not believe it correct to think lightly of such a condition. We had 18 per cent. oligopneic children, and it cannot be attributed to morphin as we gave but little morphin. If the condition is due to morphin, the children would not react so quickly upon irritation of the skin, as they do. In addition to oligopnea, Gauss observed 13 per cent. asphyxiated children. We had 15 per cent. This also has to be put down without further ado to scopolamin. Scopolamin causes protraction of birth and protraction of birth causes asphyxia."

Hocheisen fails to mention that asphyxia often occurs without scopolamin, because of the entanglement of cord about the child's neck and from the aspiration by child of the amniotic fluid; that the latter was undoubtedly to blame in some cases is proven by the fact that he states, "four of these asphyxiated children had bronchitis"— a most usual result of amniotic fluid in the bronchial tubes.

"One child," he says, "died one hour and a quarter after birth; postmortem showed a disease of the blood. This case cannot be wholly blamed

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on scopolamin." One wonders in what way it could be blamed at all!

"Another especially oligopneic child died after four hours; postmortem showed lungs to have been affected as the child aspired a quantity of amniotic fluid. The child had been delivered by forceps." After this account we are scarcely prepared to find Hocheisen declaring: "Indirectly, this death was certainly the effect of scopolamin."

In summing up, Hocheisen says: "In our 100 cases of normal, uncomplicated births under scopolamin we had 18 downright negative results and 21 cases of mediocre effect."

Hocheisen ends his report by declaiming dramatically:

"Away with the Dämmerschlaf!"

Before we proceed with the report of von Bardeleben given at this meeting immediately after Hocheisen's, I would like to give a few quotations from medical men on the Hocheisen report.

R. C. Buist, gynecologist of the Royal Infirmary of Dundee, says in the *Scotch and English Medical Journal* of July, 1907: "In their critical papers Hocheisen and Steffen[4] have assembled all the information they could lay hands on as to the dele-

[4] The Steffen report will be given in a later chapter.—H. R. V.

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terious effect and inefficiency of hyoscin (scopolamin), but the stress of their contention must rest on their experiences, and they differ so widely from that of Gauss that on one side or other a large personal equation must be allowed."

Max Salzberger of Kulm (in Western Prussia) in his publication, "On Danger to Child from Scopolamin-morphin Administered during Birth," says:

"Hocheisen, as well as Steffen, mentions instances where muscular action was completely stopped. Of course their method of dosage is quite different from Gauss's in spite of their assertions to the contrary."

Preller of Mannheim says:[5]

"On the strength of 100 cases observed by him, Hocheisen came to the conclusion that scopolamin should be condemned on account of its dangerousness. I believe such rigorous judgment to be unjustified."

Wilhelm Tichauer of Breslau in "Scopolamin-Morphin in Obstetrical Practise" (published in 1911), in writing of Hocheisen's experiments, says:

"It is clear that the procedure varied considerably, and then in the most important points, from that described by Gauss. Under such conditions

[5] *Münch. Med. Wochenschr.*, No. 4, 1907.

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it is not to be wondered at that Hocheisen obtained quite different results. On the strength of his experiments Hocheisen considered it his duty to warn doctors against the use of the method, especially in private practise. It must be borne in mind that in the case of such a difficult procedure as that of producing Twilight Sleep, initial failures were natural and at first unavoidable, and they must be all the greater when the medical man in question does not utilize the experiences of his predecessors and does not accurately follow the procedure laid down by them — a procedure based on their experience — but goes his own way. Under the circumstances Gauss's Dämmerschlaf can hardly be debited with Hocheisen's failures."

Now for the von Bardeleben report:

"At first I was extremely in favor of the method," he says, "because of the success of our early experiments.

"One patient after bearing in Twilight Sleep declared quite jauntily, 'Having babies at your clinic is so painless, I should not mind looking you up again next year.'

"The subsequent results of our experiments decreased my enthusiasm.

"It became an almost constant occurrence, in our

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confinement ward, for a woman to remain for two or three days in labor without definite results.

"Recently the midwife asked me whether these injections might not be stopped so that the torture resulting therefrom to the staff, who had to watch the patient for two or three days, could be put to an end.

"The labor pains after the scopolamin injections occur less frequently and after longer intervals.

"The effect on each individual differs in an incalculable manner. The most serious influence is on the abdominal action."

As the following "scopolamin death" of von Bardeleben has been given such notoriety, I shall give a full account of it in his words so you may draw your own conclusions as to how far scopolamin was to blame.

"Four hours after an injection of .0003 g. scopolamin spontaneous delivery took place without any disturbance. The Dämmerschlaf seemed especially successful, the mother perceiving nothing of the birth, but afterward she complained of a dull feeling in the head, her pupils were enlarged, the heartbeats increased, and breathing was shallow. About two hours after birth there was a slight hemorrhage which soon ceased. Two hours later there was renewed hemorrhage on the removal of the

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placenta; this hemorrhage was stopped after rinsing of the uterus; up to now the patient had lost about half a pint of blood. After a further half hour hemorrhage began again, the patient losing a fourth of a pint of blood. Pulse was unchanged. After another half hour pulse became weaker and the patient collapsed suddenly; the breathing became superficial and weak and she lost consciousness. I applied at once an injection of two pints of salt water and gave injections of camphor and caffein without avail. Massage of the heart was continued for one hour but I could not reinstate spontaneous respiration. There was no suffocation, no gasping, the breath became slower and slower, the pulse ever more rapid and so the woman perished. It seemed to me like an experiment on an animal!

"Scopolamin acts upon the breathing center and upon the heart; nevertheless, I believe it would be too hasty a conclusion to say this was only the effect of scopolamin or a direct case of poisoning.[6] The loss of blood probably played its part in the death. But I feel justified in saying that the patient did not survive the hemorrhages because she

[6] Kionka, of Jena, in *Therap. d. Gegenw.* (1908) says, "I reject the statement that scopolamin is a cardiac poison and injures the muscles of the heart. The breathing is affected and the heart action stopped only after quite enormous doses as compared to those which attain a usual narcotic effect."

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was at the same time under the injurious effect of scopolamin. The postmortem bore this out; a greater quantity of blood was found in the lungs and very little in other organs; this can be attributed to asphyxia, but it may also occur in anemia."

I want to give Gauss's reply almost literally from my translation, for this answer made eight years ago to these, some of his most distinguished and violent opponents (Bumm, Hocheisen, and von Bardeleben), still stands to-day as one of the most trenchant and all-embracing replies he has ever made to his critics.

Gauss begins by saying: "I want to ask Herr Hocheisen what preparation has been used."

Hocheisen: "Merck's."

G.: "What initial dose was given?"

H.: ".0003 to .0005 g. scopolamin."

G.: "Together with .01 g. morphin?"

H.: "According to the effect. If the effect was quick no morphin was given; if no effect occurred, I gave .01 g."

G.: "By what did you judge the effect?"

H.: "I judged the time when I found the sensation of pain was no longer perceived. The second injection was without morphin or again .01 g. morphin."

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Gauss: "As the drug cannot have this curious difference in its results and as furthermore the drug used appears to be the same, the cause of the varying result can only be ascribed to difference in technic. The reply to my last question confirms this, as I had expected. Your judgment of the effect is absolutely different from the method indicated by me. The second injection is not to be given when it is ascertained that the recurring pain can no more be apperceived but when certain varying impressions of the senses are no more apperceived. I believe that this elementary difference in our technic is the explanation for the whole series of failures which, to my regret, Herr Hocheisen has reported.

"I may perhaps once more give a brief sketch of my technic used to induce Twilight Sleep. I give a patient with labor pains occurring within from five to ten minutes .0003 g. to .00045 g. scopolamin together with .01 g. morphin and then I wait about two hours; if there is still a clear apperception of sense impressions I give her a further but smaller injection of .00015 g. scopolamin without morphin; the test of apperception of sense impressions is made as follows: I examine a patient and then about one-half hour later I ask her, 'Have you been already examined to-day?' She says,

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'Yes,' then I know that the sense impression, at the time of examination, was stored in her memory or apperceived. I give her now a second injection of before mentioned strength, .00015 g. scopolamin. Then I wait once more half an hour. As a rule after ten minutes perceptible changes in the clinical aspect occur. I ask her now, for example, 'How many injections have been made?' She says, 'Two.' This shows that at the time of second injection she was still clearly conscious. If I show her a knife and ask her one-half hour later, while showing her the knife again, 'Has this instrument been shown you before?' then she may say, 'No.' From this moment it is certain that she is in the Dämmerschlaf.

"If I have correctly understood Herr Hocheisen, he continues to administer scopolamin until the pain as such is no more apperceived.[7] This would be such a tremendous difference of technic that the whole secondary effects, which appear to be very

[7] Gauss had clearly stated that the patient's complaints about continued suffering could be no criterion by which to judge the effects of drugs, because even after the patient is in the state of Dämmerschlaf she may still cry out loudly at each pain; this apparently perceived pain is not recalled at all after birth. If Hocheisen used the "apperceived pain" as a test, he then undoubtedly, in many cases, must have continued injections upon a patient already completely in a state of Dämmerschlaf — the result would be serious overdosing.

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regrettable ones, must be characterized as the consequence of relative overdosage.

"I may now enter upon the series of reproaches made by Herr Hocheisen against my method. It is rather difficult to answer all his objections, as almost the entire category of disagreeable accidents to women in labor and childbed which could happen have been mentioned by him. It is beyond my ken in what degree the observations were made objectively and in what degree the proofs of his accusations are irrefutable. With regard to his point, that occasionally considerable chloroform had to be used, as there were violent states of agitation, I can only say I have not made any observations of a like character. We suppress any cases of slight agitation by use of chlorethyl. If among Hocheisen's 100 cases there were only six of complete amnesia at birth, this may be only the consequence of incorrect or intermittent control of Dämmerschlaf. Among nearly 1,000 births treated by me with scopolamin there were at least 70 per cent. of the births with more or less complete amnesia, so that the patient from the moment of effective injection did not remember anything about the birth. I have never observed such great subjective and objective disturbances as I have heard reported to-day.

"I believe to have been misunderstood when I

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made statements about the seclusion of patients. Seclusion is only possible with patients who are delivered in private wards; as at Berlin, we also have in our other wards several women in labor together; to separate them entirely from each other is of course not possible, but we try to seclude them as much as we can. Our best results are obtained by absolute seclusion.[8]

"I begin now on the subjective side effects; it cannot be denied that vomiting, red face, vertigo, unrest, delirium, and twitchings make an ugly impression, but I cannot understand that this bad impression should have a decisive influence upon the use or disuse of a drug. If some of these effects occurred after scopolamin-morphin injections, they need not have been caused by the effect of drug. I believe, at least, that an equal number of such side effects may and do occur without scopolamin; vomiting, headache, perspiration, are symptoms which may occur at any birth. I do not deny that thirst, twitching of hands, and red face are the ef-

[8] Krönig in a 1908 publication says: "When 6 or 7 parturient (childbearing) patients lie side by side in one ward it is obviously impossible to obtain an even fairly effective semi-consciousness. The number of cases in which we obtain loss of memory is far smaller in those deliveries which occur in the general ward than in the case of patients treated in the private wards where they lie in a separate room protected as far as possible from all impressions of sight and hearing."

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fects of scopolamin. But I do not find in the least that I have ever had the impression of pronounced poisoning in my patients such as have been described by Herr Hocheisen.

"I believe the constant presence of a practitioner to be necessary on account of the calculation of doses.

"Among the objective side effects there has been mentioned an influence upon the labor; if I have observed an improvement of the labor in 30 cases it means that the labor has been stimulated considerably toward the end of the birth. In 21 cases of Hocheisen's the labor became so weak that sometimes it stopped altogether. Since making use of considerably smaller doses of scopolamin than those used formerly and desisting almost entirely from the use of morphin, I have not observed any weakness of the labor. In those few cases where labor is diminished so that there is a risk to the process of birth I have naturally stopped the scopolamin injection.

"According to Hocheisen, abdominal action was diminished in 24 cases, 4 of which required forceps. It is, I believe, an accident that during the last three months of my statistics published, I had a relatively high frequence of forceps, whilst during the following six months I had altogether only 10 for-

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ceps cases without having altered the method. In any case we have at present no more forceps births in Freiburg than we had formerly, although we now give every patient that enters the delivery ward scopolamin injections. The frequence of operative interference is at present even smaller than formerly. Compared with the time of Professor Hegar's directorate at Freiburg it is greater, because the life of the child is at present of greater importance than was formerly the case.[9] With regard to the observation that it would be easy to use forceps in 25 per cent. of all scopolamin cases, I have nothing to reply, because if that were true then we would have to use forceps continually in Freiburg and such is not the case.

"As to the duration of the birth, which has been here discussed in detail, I remember that during our first large dosage of morphin a duration of three and a half hours was usual in case of first child and an hour and a half in other cases was the record, so that the duration of births scarcely exceeded the time calculated by Herr Bumm to be the normal. If Professor Bumm seems to arrive at the low figure of one and three-quarters hours as the length of

[9] Hegar always insisted on saving the mother irrespective of danger to child, and he was disinclined to use the forceps on account of possible injury to the mother.

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normal birth in his publication, this may be explained by his calculating only uncomplicated head presentation, excluding narrow pelvis, placenta praevia, and other complications. All conditions have been included in my statistics.

"The after-birth period in scopolamin-morphin has not only not been retarded, but the after-birth was never before expelled spontaneously within the first half hour until we began our use of scopolamin. Extreme debility or atony" (wanting in tone or vigor) "I have not witnessed more frequently among my cases than occur generally, not to mention that among my one thousand scopolamin mothers we have not had a single case of a mother bleeding to death.

"We always await spontaneous course of after-birth. As to the disposition of the uterus to relax, I have not seen it more in scopolamin births than in births without.

"With regard to child-bed I can make no comparison with the figures of Hocheisen, as for a considerable time we have let all the patients get up within the first days after birth, thereby, one might think, a good contraction would be rendered impossible, but curiously enough the reproductive organs of patients upon the sixth or seventh day are con-

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tracted so much that the uterus is very often already in the small of the pelvis.

"If Herr Hocheisen ascribes the heart attack of the patient with mitral stenosis [10] to scopolamin, I do not know that I care to follow him in his somewhat phantastical conclusion. The alienists, who often give doses up to 4½ mg. per day, have never had such accidents, although these are quite incredible doses. If mitral stenosis is found in a case of heart disease we need not search for other explanations, although I do not wish to deny that scopolamin injections in such a case would more easily have a serious consequence than in the case of a sound heart.

"Twenty per cent. of Hocheisen's cases have shown decrease of pulse. If we have ever observed any change in pulse it has only been an acceleration.

"It has been stated that we treat eclampsia with scopolamin; we treat such patients invariably by using forceps and give scopolamin besides, not with the intention of curing the condition, but solely in order to quiet patients and make them less sensitive to exterior impressions.

"Herr Hocheisen mentions disturbances of res-

[10] Contraction of the mitral valve of the heart.

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piration and heart as being counter-indications. Curiously enough I must say that we intentionally give scopolamin precisely when patients are laboring under any disturbance of the breathing organism as, for instance, in cases of pneumonia and bronchitis. We have thereby made the discovery that patients can then more easily stand difficult operations and long narcosis, whereas formerly we would not have operated on such cases, considering complications of the lungs.

"The fact that we use scopolamin in case of narrow pelvis shows that we do not find that proper doses of scopolamin protract the birth process.

"With regard to the child; Hocheisen has observed 18 per cent. (as compared to 23 per cent. observed by me) of apneic children; I have to say that this 23 per cent. mentioned in my former statistics has lately been reduced to 7 per cent. in 120 cases. This shows that since the dose has been guided solely by the memory test the effect upon the child has been reduced. Among 120 born last week at the clinic, 103 were lively, 7 asphyxiated — that is to say 110 were born without intoxication; 7 were partly oligopneic, partly apneic. I consider these two conditions to be a difference in degree of intoxication — apneic being the greater degree. Three children were born dead.

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"I think it is a mistake to consider asphyxia as an aspect of scopolamin poisoning. If the child is poisoned by scopolamin it shows unmistakable symptoms, viz.: a feeble movement of eyelids and a crippling of the reflexes (involuntary movements, such as winking the eyelids). In my statistics only that per cent. of children born without intoxication was stated as asphyxiated. I must decline to admit asphyxia to be always a consequence of birth protracted by scopolamin, because if all births were protracted in our clinic, in the manner they seem to have been protracted in the cases here stated, we would be unable to accommodate all the patients, at the same time seeing that we give them all scopolamin. I have not seen the proof that asphyxia caused by aspiration could be a result of scopolamin, as both aspiration and asphyxia occur also without scopolamin. The number of children that are still-born is not only as small as previously at our clinic, but it has been reduced.

"I cannot agree with the fear that the apneic children would perish if they were not artificially roused. I have waited up to twenty minutes when I found that they breathed again in normal rhythm. If Hocheisen and von Bardeleben had cases where the children were oligopneic up to three-quarters of an hour and if then sometimes assistance was neces-

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sary without which the children would have died, this is only, to me, a confirmation of my supposition that their technic and dosage were very different from mine, because among the 1,000 children in my statistics some would then have undoubtedly died, because I gave no assistance to them. I may once more point out, that in order to call a scopolamin Dämmerschlaf irreproachable, a child should be born lively. A birth resulting in protraction and an apneic child can always be considered as an indication of miscalculated scopolamin doses."

Geheimrath Bumm, replying to Gauss, said: "We believe that in questions of mitigating pain we should ask patients whether they still feel any pain. Herr Gauss enlightens us now by explaining that we should, on the contrary, only ask if she 'apperceives' a knife, for instance, and then calculate our doses accordingly. I cannot believe that the vast difference which has been shown to exist between our observations and those of Gauss are caused by the difference in method or technic, but by the difference of the *manner* of observation. It is possible to look at a thing soberly and to look at it optimistically; we made our observations soberly."

Hocheisen, then rising, defends his quantity of dosage, pointing out that in 44 cases Gauss's small-

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est initial dose had not been exceeded; he adds: "I do not care to go into details about the technic of Gauss's Dämmerschlaf, as I consider it too hair-splitting and complicated. Our technic was to consider the complaints of the mother as an indication of the scopolamin effect. If the patient still complained of pain, the pain was evidently not diminished and she was suffering; perhaps she does not 'realize' the pain, but this is not what we call a 'painless birth,' either from the point of view of the practitioner or the lay public."

In conclusion, he says with unconscious prophetic emphasis:

"The future will show who is right. If scopolamin remains, Herr Gauss will be right; if it disappears, I shall be right."

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VII

Gauss's Published Reply to Hocheisen

THE Bumm-Hocheisen denunciation of the Dämmerschlaf was too serious a matter to be ignored. As a result Gauss immediately made a public reply.[1]

After only 100 cases, Hocheisen felt justified in condemning the method. In Gauss's reply he gives the results of his own first 1,000 cases.

"It is important now to discuss this matter on principle," writes Gauss, "as all the late medical literature contains reports on scopolamin-births which, in spite of apparently dealing with the same object, show great difference in method.

"Of all the publications on the subject only that of Preller, of the Mannheim Asylum for Women in Childbed, gives a description of scopolamin-morphin technic similar to our own.

"Hocheisen's technic differs so entirely from that

[1] "Report on My First 1,000 Births in Scopolamin-Morphin Dämmerschlaf," by C. J. Gauss. *Münch. Med. Wochenschr.*, pages 157-161, 1907.

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of the Freiburg method, it is impossible to draw a parallel.

"The important question is not *what* is given, but *how* it is given."

Hocheisen rather unfairly used the reports on the use of scopolamin for sedative and narcotic purposes to deduce opinions as to the harmfulness and incalculability of the drug in obstetrics. As long as he was doing this it seems remarkable, as Gauss points out, that Hocheisen failed to refer to the most important paper on scopolamin published by any alienist — that of Bumke, of the Freiburg Insane Clinic (Director Geheimrath Hoche).

In this clinic they have made many thousands of scopolamin injections. At an average, sixteen patients daily receive single doses of .001 or .0005 g. scopolamin, the maximum dose rarely exceeding .001 g. In the case of cataleptic women, maximum total dose of 4½ mg. are repeatedly reached in twenty-four hours.

Such symptoms as are cited by Hocheisen have never been observed in Hoche's clinic, and it is there denied that any serious disturbance of the general state of health occurs as a result of the injections.

According to Bumke, breathing, in scopolamin sleep, is somewhat deeper than in ordinary sleep, but it is never irregular or difficult. Bumke cites Edlef-

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sen and Illing, who have employed scopolamin to advantage in asthma; he further cites Korn, who used .01 g. scopolamin on a patient with heart disease (in spite of emphysema [2]) without causing the slightest symptom of suffocation.

Although scopolamin is excreted through the kidneys, Gauss says no injury to the functions of these organs has ever been proved.

"My first investigations upon fifty cases showed no effect of scopolamin upon the kidneys and my last investigations in one hundred cases attain the same result.[3]

"Further to support his warnings against scopolamin Dämmerschlaf, Hocheisen cites the records of scopolamin-morphin narcosis in surgery. Many besides Hocheisen bring up this comparison time and time again, and so mislead the general opinion about the effect of scopolamin and thereby sustain a fear of the drug.

"One should not lose sight of the vast difference between the surgical dose of .0036 g. scopolamin +

[2] A swelling produced by air, as dropsy is caused by liquid.

[3] Statistics of 100 cases —

At Birth	*When Leaving Clinic*
80—*No* albumen	*No* albumen
12—Albumen	*No* albumen
3—Albumen	Albumen
1—*No* Albumen	Albumen

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.03 g. morphin administered in three hours and the administration of only a small fraction of this quantity, spread over a manifold longer period, in Twilight Sleep.

"As far as I can discover, all death cases associated in literature with scopolamin-morphin have occurred during scopolamin-morphin surgical *narcosis*."

As Bumke has observed, in most of these cases there is no complete record of all the details which alone could furnish proof that scopolamin was the cause of death. There is also a singular absence of statements about the age and condition of the scopolamin employed.

"As a matter of fact," says Gauss, "it is not at all surprising that Roith's dose of .0036 g. scopolamin to .03 g. morphin should have proved fatal — it is rather a matter for wonder that anybody should have expected the contrary."

Then, too, we must take into consideration those certain rare instances of a patient's intolerance or idiosyncrasy to the drug, but such cases should not discredit the drug in the face of the many thousand favorable cases. As Tichauer of Breslau says: "It would be absolutely unjustifiable to deprive all women of the benefit of scopolamin because of the rare cases of individual idiosyncrasy."

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Bumke says: "It would be of great advantage if the harmlessness as well as the positive good results of scopolamin could be more widely known."

To quote Gauss again: "After Hocheisen had claimed to have followed my method, let us look at the actual facts: He says: 'I do not consider at all Gauss's statements about diminished faculty to remember, summary memory or participation of single sense organs, as the scopolamin sleep of our patients showed such different symptoms that, from our cases at least, I could not establish a gage for such fine physiological-psychical observations.' These words contain a clear renunciation of my main guide in scopolamin-morphin Dämmerschlaf. I repeat my words: 'Without a continuous, tactful test of the state of consciousness it is impossible to maintain an effective continuity of artificial Dämmerschlaf.' Hocheisen exposed himself to failure by his disregard of these instructions. He admitted quite frankly that he continued to administer scopolamin until the pain of labor was no longer apperceived; naturally then all the serious side effects occurring in his cases were certainly the consequences of relative overdosage.

"It is, furthermore, really surprising that Bumm's clinic had not more disagreeable incidents, considering the fact that the 100 cases were not treated by

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one physician but *two*, for it is natural with so difficult a technic as that required to induce and maintain a Dämmerschlaf, that failures must occur until a positive experience with the method has been acquired by the physician."

GAUSS'S EXPERIMENTS WITH THE HOCHEISEN SOLUTION

In order further to discover the cause of Hocheisen's failures, Gauss obtained from Hocheisen some of the Berlin Charité solution. In unpacking it, he noticed a fine sediment which, upon shaking the vial, caused the whole liquid to be clouded. To conclude that such a condition was merely caused by transportation, Gauss considered "far-fetched." He then proceeded to experiment on ten patients (poor patients!) with the Hocheisen solution. The narcotic effect was so strong and rapid that in three out of seven cases Dämmerschlaf occurred within one and a half hours. One sleep was attended by deep coma with great influence upon abdominal and labor action; three times heavy atonic hemorrhages; one deeply apneic child; four times great excitement; one case of vertigo; one lasting case of vomiting.[4]

[4] Gauss observes that Hocheisen also evidently did not use the test of scopolamin advocated by Otmar G. Kessel of Jena Pharmacological Institute (at that time used in Freiburg before the Straub investigations were made, on which we will

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"The cloudiness of this solution," says Gauss, "probably indicated fermentation of apatropin."

A second unclouded solution sent Gauss by Hocheisen produced almost equally bad results; one deeply apneic child; one case had to be terminated by forceps because of cessation of labor; three cases of atonic hemorrhages. As Hocheisen apparently did not note form, age, origin, or manner of preparation, or storing of drug, Gauss feels justified in ascribing, still further, the bad side effects to Hocheisen's use of a drug in spoiled condition.

Gauss proceeds: "As Hocheisen states that the 'scopolamin Dämmerschlaf is not in accordance with the duties of a conscientious doctor,' I have felt it necessary to go into a somewhat lengthy reply to his criticisms before reporting on my 1,000 births. I shall first consider the disadvantages which, according to Hocheisen, must be ascribed to scopolamin."

MORTALITY OF MOTHERS

"Among my first 500 cases there was not a single death of a mother. Among the last 500 there was one death, but it could not be ascribed to scopolamin.

write later), of a drop of thin solution of calcium permanganate. If the solution contains apatropin this test is so sensitive that in a solution of one part apatropin in 20,000 parts of the 40 per cent. watery scopolamin solution, the solution shows a reaction.

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It was a case of colporrhexis on account of very narrow pelvis; even laparotomy" (cutting into the abdomen), "immediately resorted to, could not save the patient from bleeding to death.

"Among these last 500 there were 23 women with pronounced heart disease (cardiac lesions).

"If scopolamin does really endanger the heart, as Hocheisen claims, it seems very curious that we did not have a single attack of heart trouble.

"Since 1905, in addition to my own close control of the patient's heart, Professor Clemens, and later Dr. Link, have examined every patient before childbirth to ascertain the condition of both heart and lungs.

"Hocheisen points out 'the danger of hemorrhage from the use of scopolamin.' I have measured the blood loss in a series of 363 patients during the placental period, so I am in a position to reply to this statement with figures.

337 times	(92.8 per cent.)	lost up to 500 g.=average of 190.4 g.
23 times	(6.3 per cent.)	hemorrhage from 599 to 1,000 g.=average of 645.5 g.
3 times	(0.9 per cent.)	hemorrhage endangering life, of from 1,000-1,500 g.=1,255 g.
510 times=51	per cent.	the after birth in 1,000 cases was spontaneous.

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481 times = 48.1 per cent. by slight pressure (Credé).
4 times = 0.4 per cent. by manual loosening.
5 times = 0.5 per cent. by manual loosening with Cæsarian section.[5]

"By comparing the above figures with others' statistics the results are bound to be very much in favor of scopolamin."

THE USE OF FORCEPS

"As a test of Hocheisen's statements as to the excessive prolongation of birth, let us glance at the forceps statistics of my 1,000 births. Among the first 500 there were 49 forceps = 9.68 per cent. Among the last 500 there were 25 forceps, making a total in the 1,000 cases of 7.32 per cent.

"Even such an illustrious obstetrician as Bokelmanns confesses to a necessity to apply forceps in 40 per cent. out of 335 private cases reported on in his paper read at Berlin. This report was published without causing criticism or comment from his fellow physicians."

Among 163 further private Dämmerschlaf cases of Gauss's, conducted outside of the clinic and not included in his 1,000 births, he did not use the forceps in a single instance. As Gauss says: "We

[5] An abdominal incision for extracting the child from the uterus. This operation was first performed by a Dublin midwife.

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are in the agreeable position that we may conduct a birth independent of the complaints of the women in labor and above the reproaches of the impatient and anxious relatives, as we know that the patient in complete Dämmerschlaf has absolute amnesia" (impairment of memory of pain); "'considerations,' to quote Herr Hocheisen, 'for the surrounding lay-public which is expecting a painless birth in physiological sleep,' which so concerned him do not concern us or influence us in the slightest from desisting from Twilight Sleep."

Wilhelm Tichauer, commenting in 1911 on the Gauss-Hocheisen controversy, says, in regard to Hocheisen's claim that "a lay-public which is present at a Dämmerschlaf birth receives a very bad impression from the side effects"—"surely," says Tichauer, "such considerations should not induce a doctor to deprive a woman in labor of the benefit of lessened pain. It seems much more simple to keep the lay-public away from such patients or, if such should not be feasible, to simply warn them beforehand of what is to be expected."

THE CHILD

As to the new-born, as Gauss clearly pointed out in his first publication, if the memory is carefully tested, overdosing of the mother is avoided and the

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consequent bad effects on the child. In the statistics of his 1,000 births, Gauss found the per cent. of oligopneic children greatly lessened by a reformation of the early doses of morphin and an improvement in technic. There were in the last 50 cases only 5 oligopneic children, and these were births in which the desired effect had to be attained in the short period of from two to six hours on account of the late arrival of the mothers at the Frauenklinik, which necessitated an injection of .0012 g. scopolamin, and in one case .0015 g. scopolamin. In the majority of cases where there was ample time in which to begin the Dämmerschlaf, there were no bad effects on the child. In the later 500 births the statistics were as follows: Lively 78.6 per cent., oligopneic 12.7 per cent., asphyxiated 6.3 per cent.

"In 117 not especially selected cases of more recent date," reports Gauss, "there were only 6 per cent. oligopneic children.

"Since the adoption of scopolamin at the Frauenklinik, the number of children dying from injuries at birth has been reduced by 3 per cent.

"Among Lehmann's 70 scopolamin births there was no death of a child. Among Preller's 220 cases only one child died and that, he says, could in no way be ascribed to the effect of scopolamin."

As for Hocheisen's concluding remarks in his

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chapter on the child, viz.: "It remains to be seen whether it is unimportant to the mental and physical development of the tender organisms of the child that such a dangerous poison should be transmitted to it from the mother, when it is in the uterus," Hoche[6] replied, in his discussion at the Freiburg Society of Doctors, that such a conclusion is "abstruse," and in the *Munich Medical Weekly* of 1907 he furthermore adds: "This supposition of Hocheisen's belongs to the realm of comic fable."

THE ONLY GUARANTEE OF SUCCESSFUL DÄMMERSCHLAF

To attain the successful Dämmerschlaf achieved at the Freiburg Frauenklinik, Gauss reiterates that only the most exact precautionary measures can guarantee success, and every individual woman in labor necessitates such extreme and intensive observation of her individual condition of consciousness that it is difficult for one doctor to watch a number of patients at the same time and in the same room without having to fear overdosage.

"The extent to which the method can be adopted in clinics and general practise depends entirely upon whether the respective doctor can and will take the trouble to follow out instructions closely. As long

[6] A nerve specialist of distinction.

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as these instructions are disregarded, we absolutely decline responsibility for injuries by scopolamin.

"The security of Twilight Sleep and its particular effect are based solely upon the test of memory. He who believes he can use scopolamin without this continuous test is making a new method of his own, but it is no Dämmerschlaf."

The reply which Hocheisen made to this publication of Gauss's holds absolutely no material and is not worth reproducing. I shall, however, give you his final words, as they at least show spirit and a certain sort of picturesque stubbornness:

"If I am right, scopolamin, together with the Gauss cleverly coined word 'Dämmerschlaf,' will disappear from the scene after a time, just as many other loudly praised methods have done. If he is right, within a few years all women will share painless birth without risk and I shall then have to admit having been wrong. For the present, however, I take the liberty to continue to warn all practitioners — the optimistic reports from Freiburg notwithstanding."

EARLY RISING AFTER CHILDBIRTH

In a short article published in 1907 following the report on his first 1,000 births under scopolamin-morphin, Gauss said he had adopted the method

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recommended by Küstner with regard to the early rising after childbirth. "Anemia, debility, heart disease, varicose veins, existing or suspected infection," says Gauss, "are strong indications to make the patient get up as soon as possible. Healthy mothers are permitted to get up when they choose.[7] The state of health of the early risers is decidedly better than that of patients getting up later. The capacity for nursing shown by the patients who have risen early is also far greater than that of patients getting up later, a fact which presents new aspects for increasing the milk secretion. The involution of the abdominal layers of skin, in the case of early rising mothers, was good when leaving the clinic as well as at a later examination in from six weeks to one year. Those whom I made perform gymnastic exercises showed more firm and rigid abdominal muscles than the others. The involution of the vagina showed similar favorable results. Comparative observation of the pulse showed no injury to the heart action. The sooner the patient gets up the more rarely fever is observed."

[7] At present it is the custom at the Frauenklinik to encourage all mothers to get up the first day. In the case of any tendency to hemorrhage, the mother is made to get up almost immediately after delivery; this is to prevent the formation of blood clots and because of the benefit to the circulation generally.

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BED EXERCISES

These gymnastic exercises referred to by Gauss, I am able to describe from personal observation of mothers performing them. The first exercise consists of lifting the body entirely without assistance of hands, placing all weight of reclining body on the shoulders, elbows and heels, making an upper curve of body at waist to a degree that enables the nurse to place her arm between bed and middle back of patient; the nurse then assists with arm to further elevate the center of body to a still higher curve.

The second exercise: The patient, lying flat without pillows, lifts one leg up perpendicularly, then swings it around in rotary motion; this exercise is then repeated with the other leg.

The third: The body still lying flat, both legs are then flung upwards towards the head as if to go over head, and when they have reached their limit the patient then grabs herself with both hands placed under the knees and pulls the legs upward as much further as she can get them.

A fourth exercise I saw performed by an American mother a few weeks ago, two days after childbirth. This mother had not been able to sit in an upright position for four years because of a stiff hip

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and leg caused by blood poisoning at her last childbirth, in America, from injuries by forceps.

During this American's first conversation with Dr. Krönig on her arrival at the Frauenklinik, she asked: "Won't scopolamin cure my leg?" "Oh! you Americans!" exclaimed Dr. Krönig, flinging up his hands in despair. "You expect scopolamin to perform the miracles of Lourdes."

Dämmerschlaf was induced at 7.30 at night after this mother had only experienced a slight backache; the child was born at 1.30 A.M., and the mother awoke at nine o'clock the following morning not realizing that the birth had taken place. No forceps had been used, the birth had been perfectly normal and the child lively. The mother had no after pains, and no weakness or soreness.

While I was present the second day after the baby was born, this patient suddenly discovered, while performing some exercises, that she had recovered the use of her four years' disabled leg. Her joy was overwhelming. This discovery was also made in the presence of an American doctor who had come all the way from California to investigate the Gauss Dämmerschlaf.

The exercises, in which the discovery was made, were those of the leg revolution and another exercise, which I had not before seen; the mother sat up

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erectly in bed (a thing she had not been able to do for four years because of rigidity of hip) and slowly let herself back without assistance of hands to the flat reclining position.

The California doctor was amazed at the ease with which this was done, declaring that this ease proved the abdominal muscles to be absolutely restored to normal strength after the incredibly short length of time of fifty-eight hours after childbirth.

The head nurse, summoned to hear the joyful news of the mother's recovery of the use of her limb, acknowledged that she had endeavored to stretch the muscles of hip during the Dämmerschlaf, "but," said she, pointing to the wonderful new infant in the bassinet, "you have *him* to thank for your cure."

The California physician then said: "The entire relaxation of the whole muscular system in childbirth has induced the recovery of the use of your leg muscles; the *perfectly normal birth* of a child produces a most wonderful physiological metamorphosis in women — a woman is re-made, and her entire health reconstructed and made perfect. All births *should* have this effect, but with the lack of proper care of mothers before birth, the impatience of physicians at birth, and the unnecessary use of forceps, this benefit to mothers is unfortunately not the rule nowadays but the exception."

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VIII

Dr. Preller's Experience With the Dämmerschlaf [1]

AFTER Hocheisen's report, it is really refreshing to read Preller's account of his experiments, which, as Gauss says, is the only one of this period which shows a close observance of the Freiburg rules.

As the Hocheisen-Gauss controversy was still the absorbing medical topic of the day in Germany, we find Preller constantly referring to it throughout his report, with much criticism of Hocheisen.

Altogether out of a total 1,000 births from October 1906 to October 1907 at the Mannheim Klinik, 220 were treated with scopolamin-morphin.

The first five hundred of these cases were treated by Preller's predecessor, Dr. Eckert.

Preller says: "Eckert's small success necessitated great changes in the method followed by him. He used scopolamin and morphin in one solution in-

[1] "About the use of Scopolamin-Morphin in Obstetrics," by Preller, Assistant at the Mannheim Klinik, *Münch. Med. Woch.*, No. 4, 1907.

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stead of separate solutions, as recommended by Gauss.

"The effect of Eckert's doses [2] was considerable scopolamin intoxication; the patients suffered enormously from heat, restlessness, reddened faces, hallucinations and delirium.

"Like Gauss I have used drugs in separate solutions of .03 per cent. scopolamin and 1 per cent. morphin. Only by systematically following Gauss's instructions can a correct Dämmerschlaf be obtained."

Preller's extreme clearness of statement as to exact amount of scopolamin and morphin administered by him, makes his paper of great value. It is interesting to note that he continued to use morphin in the second and sometimes in the third and fourth injections — unlike Gauss — yet he apparently had no bad effects therefrom.

The first injection of .000375–.00045 g. scopolamin + .01 g. morphin was given when the pains occurred at intervals of from 5–7 minutes.

I think Preller has given us the keynote of the secret of success in Dämmerschlaf in the following words:

[2] Eckert's dose was .009 g. scopolamin + .01 g. or .02 g. morphin in 20 g. of water; one full needle at first injection and one-half or again a full needle given at one to several hours later.

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"The results depend entirely on the experience of the physician in cautiously giving the first dose and in subsequent carefully calculated doses according to the condition of patient."

He continues: "I have had cases where .000375 g. scopolamin + .01 g. morphin produced a Dämmerschlaf lasting two hours without waking even during vigorous labor, while in other cases .0006 g. scopolamin + .01 g. morphin had but little effect.

"If first injection does not attain the desired effect, a second injection of exactly calculated dose, varying between .00015–.0003 g. scopolamin + .003 –.004 g. morphin, is then given.

"By this method a too rapid or immediate effect of the drug is avoided and a progressive calming of the patient is attained without any danger.

"Within about a half hour after the second injection the patient generally shows symptoms of being in the Dämmerschlaf. In my third and fourth injections I frequently find an addition of .004–.006 g. morphin necessary.

"In rare cases of especially robust women (who would doubtlessly have shown an equally strong resistance to other narcotics) and in cases of vehement labor with narrow pelvis, I have found it necessary to give a first dose of .0006 g. scopolamin

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+ .01 g. morphin, following it with a second injection of .0002 g. scopolamin with morphin again.

"The total quantities used by us during entire narcoses never exceeded .0015 g. scopolamin or .02 g. morphin, even in our longest cases, lasting sixteen hours."

In Preller's 120 cases he attained Dämmerschlaf in 70 per cent.

He says: "I use the term 'successful Dämmerschlaf' in a somewhat wider sense than others might, or even Gauss himself would, for my principal aim is to attain a quiet sleep during the intervals of labor, the patient waking during pains and becoming momentarily conscious of the suffering. This I consider a sufficient effect, for the patient's suffering leaves little or no trace in the memory afterwards."

Preller was up to this time the only doctor who was content to produce this less than semi-narcosis; the others forced the patient into a state of positive narcosis in which there was a deadening of the faculties and a paralysis of the muscular action, or else, by a too swift development of Twilight Sleep through miscalculation of the proper time for the second and third injections, produced a condition of poisoning in the patient which evidenced itself in violent side effects.

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"It is so easy," says Preller, "to go a step further and induce a deep sleep during which the strongest pains are no longer consciously perceived and in which the patient only groans slightly when labor is at its climax. If this deep sleep passes without resultant poisoning, well and good, but it is certainly taking very great chances and is entirely unnecessary."

Preller does not agree at all with either Hocheisen or Steffen as to the very bad impression made upon any of the lay-public who may be present at a Twilight Sleep birth.

Dr. R. C. Buist, of Dundee, gives a delightful account of what he calls Steffen's "lurid description of the patient in Dämmerschlaf," which may be summarized "as a scene in which the patient with congested face talks at large or insists on getting out of bed, while the bystanders, and especially the nurses, miss the usual piousness of the lying-in room, in somber anxiety as to whether the mother will live or the child, whose heart the doctor constantly auscultates, will breathe; and in which on the birth of the child the mother's joy is replaced by a drunken disbelief in her surroundings!" This description, says Buist, "does not at all correspond with the impression I have received from the cases I have seen."

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In Preller's first-class ward he had many scopolamin-morphin cases which he conducted in the presence of the relatives of patients.

"These audiences were often composed of the mother and the decidedly critical mother-in-law. Although my Dämmerschlaf is not carried to the extent of deep narcosis, I have never heard any fears expressed by the witnesses that the thing looked 'risky' or 'alarming.' On the contrary, I have often heard the mother of a patient regret that Twilight Sleep had not been developed twenty years earlier so that she might have enjoyed its comfort.

"In every instance I have received the grateful thanks of the women who have seen their daughters delivered in Dämmerschlaf.

"In the wards where several women are delivered at once and the scopolamin-morphin births can therefore be watched by women soon to become mothers themselves, these witnesses frequently beg me to promise that they shall later on have their 'needle' too, which certainly proves the evident reduction of pain in the Twilight Sleep patient, observed by the onlookers, while it also must prove that these witnesses received no impression of heavy poisoning by scopolamin."

In 18 per cent. of his cases Preller attained no Dämmerschlaf, but only a sleepy condition in which

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there was a considerable reduction of suffering. "In 12 per cent. the results were not satisfactory; this was (in the majority of cases) due to a too rapid progress of birth which did not give us time to produce a Dämmerschlaf; in the minority of our failures we desisted from further injections on account of observing symptoms of poisoning in the patient.

"However, from the *patient's* own subjective point of view we only failed in 4 per cent. of all cases.

"Only two mothers expressed dissatisfaction with the method. Both these women complained during and after birth of a dull feeling in the head and a paralyzing heaviness of the limbs.

"In the rest of our cases total amnesia from the subjective point of view was a complete success."

There were among his 120 cases only two instances of hallucinations. Excitement and agitation were sometimes observed during the actual pains. The pulse and breathing were regular. After the delivery, both mother and child slept soundly and woke up refreshed and without any after effects.

Of the concomitant effects of scopolamin noticed by Preller, he first mentioned an undoubted effect upon the heart. "In 20–25 per cent. of all cases there was a distinct effect, though not always of an unfavorable nature. The injections at first cause

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a more voluminous and regular pulse. Whenever I found the heartbeats increasing to 120 or 130 per minute with irregularity or inequality, I regarded it as a warning to desist from further injections or to wait at least for a considerable length of time before proceeding. For this reason I never had any serious consequences.

"I do not, however, believe Hocheisen's case of disturbance of the heart action was due to scopolamin. I have regularly observed that all symptoms of disturbed circulation quickly disappear.

"Respiration was never seriously disturbed, probably because of our cautious calculation of doses. Neither have I ever noticed any effect upon the kidneys. In one Dämmerschlaf case the patient had nephritis gravidarum" (kidney disease)"with albumen in the urine; during the beginning of birth there were symptoms of uremia, but these symptoms diminished soon after birth.

"I believe from my observations that labor and abdominal action are certainly retarded by scopolamin-morphin. Gauss is of the opinion that any diminution of abdominal action is due to too large a dose of morphin.

"On the whole, we found the birth process uninterrupted by the injections.

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" In 30 per cent. a change in the type of labor was noticed, in 16 per cent. of these cases labor was regulated and bettered, in the remaining 24 per cent. the vigor of labor was diminished, the pains less frequent and of shorter duration.

" In 18.6 per cent. of all cases the labor pains were unchanged, in 6 per cent. they were increased." Preller thinks it only fair to remember that in births without scopolamin the variations in labor are just as evident, but he feels justified in considering the weakening of labor, in cases where such weakening occurred, due to scopolamin-morphin in 15 to 20 per cent.

" There is however," he adds, " so much variation in the average duration of birth process that only by the observation of thousands of cases could a decision be reached. On the whole, my impression is that the protraction of birth by scopolamin-morphin is only slight."

In cases where the deliveries were extremely difficult, Preller says the patients " after delivery under the narcosis were much stronger and fresher than patients who had ordinary deliveries without injections."

He found that scopolamin-morphin had no effect upon the milk secretion.

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Preller takes the matter of oligopnea much more lightly than even Gauss does.

His views coincide with the opinion of an American doctor who said to me the day before I left Freiburg: "I no longer regard the oligopneic condition of the child as serious. The fact that the babies are once in awhile born in this slightly intoxicated condition from which they soon emerge uninjured, should not cause a doctor to condemn the method."

Even Steffen, as we will see in the next chapter, believes "anxiety superfluous" in regard to the oligopneic condition of the baby.

As a matter of fact, in Germany there is only one death of a child in the entire nine years of scopolamin-morphin records, which is accepted by most of the medical profession as a death due to scopolamin — this is the death of a child reported by Dr. Oscar Bass of the Chrobak Klinik of Venice. This child died from heart collapse after bathing. It is always referred to in German medical journals as "the" death.

A very reassuring and significant fact is that the statistics of the death rate of infants at the Freiburg Frauenklinik (where all mothers have the

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Dämmerschlaf) is much lower than the general mortality of infants in Freiburg born outside the clinic.

Furthermore, the infant mortality in Gauss's 1,000 cases was markedly less than the Frauenklinik statistics showed the average of the ten years preceding to have been.

Preller reports his results to have been "very satisfactory as far as the children were concerned. To include the statistics of my predecessor, in all our 220 scopolamin births we only lost one child and that was delivered with forceps because of its heart sounds and fear for the mother.

"Among my 120 children we had only 6 apneic children and that was in the beginning of experiments. Almost 25 per cent. showed the characteristic symptoms of intoxication described by Gauss as oligopnea.

"If these children are let alone they will fall asleep after from five to thirty minutes and they sleep off the intoxication, awakening fresh and crying lustily. If the condition should, however, get worse, the oligopnea changing into apnea, simple tickling of the child is sufficient interference on the part of the doctor.

"One child was born asphyxiated, but scopolamin was not the cause.

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"No lasting injuries to the child were observed, and they have always been found to develop well."

As a prelude to Preller's final remarks, I should like to quote again Dr. Buist. In reply to the question, "What advantage has the Dämmerschlaf method over the old obstetric anesthesia?" he answered: "It places a much less fatiguing method at the disposal of the obstetrician."

Preller's closing words are: "Scopolamin-morphin will probably find its only sphere of usefulness in the clinic, where there will always be doctors and a trained staff to cope with the dangers of overdosing and the requirements of the method.

"If a private practitioner wants to try Twilight Sleep among his patients outside the clinic, he may do so only after having closely studied the peculiarities of scopolamin-morphin and its dosage; such study will only be possible at a clinic.

"Last but not least, he will have to give sufficient time to carefully watch the patient's condition after the injections; on no account should this condition be treated lightly."

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IX

Several German Reports and a Wonderful American Experiment

OF the reports of the opposition which I have translated, in none have I been more impressed with the absolute sincerity of purpose than in Steffen's.[1] He made a conscientious effort to carry out the Gauss instructions, as far as he could, and only departed therefrom when the condition of mother or child demanded that he, as a responsible physician, should so depart.

Geheimrath Leopold, Steffen's chief, was so interested in the first Gauss report and so determined to give the method the largest possible chance to succeed, that he continued to urge Steffen to further experiments long after Steffen himself desired to abandon them, because of results. There was no preexisting prejudice to the method in the mind of either Leopold or Steffen, though Krönig in his pub-

[1] "On the Effect of Scopolamin-Morphin in Childbirth," by Dr. W. Steffen, Assistant of the Royal Frauenklinik of Dresden. *Archives for Gynecology*, Berlin, 1907.

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lication of 1908 says: "Steffen, on the occasion of a discussion about the reduction of pain, said that he had never felt any necessity for lessening the pain felt by women in childbirth. This is only to be explained by the fact that he is either quite callous or that when the screams and groans of women become too loud he left the room." If this was Steffen's individual opinion about the importance of lessening the pain, it is all the more praiseworthy that he completely put aside his own opinion on physiological pain and made every effort to carry to success the adoption of the Gauss method of "painless birth" at the Royal Frauenklinik of Dresden.

He remarks in the beginning that the fact that it was only used in 300 cases is significant, for had it proved the ideal method Gauss described he would have continued it indefinitely.

"At first we gave every woman in labor the first dose stated by Gauss to be the correct one, except in those cases where the necessity of an operation was evident on receiving the patient. The incalculable side effects soon forced us to make a selection of patients, excluding all cases of narrow pelvis [2] or cases where protracted and difficult birth

[2] The pelvis is that bony basin composed of hips and the lower bones of the spine, which hold the bowels, bladder, and the organs of generation.

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was expected, otherwise the necessity of an operative termination might easily and unjustly have been ascribed to the use of scopolamin and morphin.

"In the normal cases we gave the scopolamin injections at the beginning of labor pains and often witnessed the quickly slackening labor which did not develop again regularly. In such cases we did not give further doses, as the labor stopped by one injection did not recommence and the use of forceps became necessary to save the child. Eventually we only used the scopolamin-morphin injections when the child's head having already arrived at the lower end of pelvis, the labor had almost fulfilled its task and it was only a question of a few contractions to expel the child. But even then the muscles often refused to act further and we had to use either forceps or the Kristeller hand method.

"The sensation of pain during labor is generally lessened. During the intervals of pains the mother is slightly asleep, awakening at beginning of pain or when spoken to. During the action of the muscles she is awake, and when told to do so she will cooperate, but she does not obey so readily when told to cease cooperation, rendering it thereby more difficult to protect the skin from tearing than in the case of a mother whose brain function is not disturbed by narcotic effects and who is, therefore,

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able to cease assistance, in spite of the stimulus of the pain of birth. When it becomes necessary to assist by hand, the mother resists and strains in the opposite direction as her mind is not clear enough to accept the explanation that manual assistance by the doctor is necessary. These are conditions in our group of favorable births.

"In the unfavorable cases, where there is no muscular action the variable heart sounds of the child necessitate speedy termination of the birth; the child is then born in oligopneic condition. Its heart is beating, it gasps once or twice, then lies motionless; tickling of the skin is without result. The experimenter knows that this apparently serious condition is only temporary; he puts the child in a bath and observes that it begins to breathe regularly but superficially. The narcosis wears off after from ten to fifteen minutes and the child opens its eyes and begins to cry. The inexperienced physician takes great trouble to resuscitate the child, but we believe anxiety is superfluous. For the spectator, the appearance of the oligopneic child is alarming, and in private practise the midwife would undoubtedly urge the doctor to make hurried efforts at resuscitation.

"Instead of scopolamin-morphin having a quieting effect on the nerves of the mother, the patient

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This British girl, born in Twilight Sleep, has never been ill

One of the very first children ever born in Twilight Sleep

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often reacts upon the first usual dose very violently, talking confusedly of home and husband, even betraying family secrets. Gauss acknowledges that in seven of his cases the hands of women had to be tied.

"We succeeded sometimes only after five or six doses in putting patients to sleep. Considering the dangerous character of this chemical, the physician then has the disagreeable sensation of wondering if the patient will ever wake up again or not. Our injections were rarely given at intervals of less than two hours, often from three to six hours, always using the memory test as instructed by Gauss. We were, however, principally guided in our doses by the closest observation of the heart sounds of the child. To this fact we owe our low number of oligopneic children — 18.8 per cent.; while in Gauss's first 500 cases he had 36.8 per cent., and in his following 500, just reported upon, he still had 19 per cent.

"I am convinced that after a long action of the poison the integrity of the nerve cells is disintegrated, which fact is not unimportant for the later well-being of the mother. Some might object that such injuries are present in every narcosis, and the accumulating dangerous effects are generally well known; to this we might reply, narcosis in general

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is only undertaken for absolutely unavoidably necessary reasons.

"We did not use the blue glasses, or antiphones for the ears, out of consideration for our assistants, because of the repulsiveness of the picture presented."

This seems a rather poor excuse for omitting this precaution urged by Gauss.

"The agitating effect of scopolamin, resulting in slight irritation of sight and hearing, are apt to be magnified phantastically and give rise to illusions. I consider this a great defect of the scopolamin method.

"It was when this present work was in progress that there was published by Gauss in the *Munich Medical Weekly* his report on his first 1,000 births in Dämmerschlaf, and in this he now describes the apatropin test of scopolamin solutions. This test was not known to us in the above 300 cases. The fact that Gauss objected to the freshly prepared solutions of the apothecary of the Berlin Charité caused me to go personally to various apothecaries, giving clear instructions about the importance of the most carefully prepared solutions. These solutions were then tested daily in the manner prescribed by Gauss with solutions of calcium permanganate. In a further group of 20 cases, in which these solu-

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tions were used, we had, however, to desist from further injections when danger to the child appeared to be present. These cases were observed by me as well as by Dr. Richter, Dr. Leisewitz, and three assistants. The careful memory test observations of the state of clouded consciousness and retrograde amnesia were carried out mostly by myself. In no cases were the midwives or students charged with the observations, or the memory test. At the bedside of every patient, however, there was a student who had to take notes of the duration of each pain and the intensity of same; the progress of the birth and side effects being judged by the doctors.

"It is interesting to note that in one case where *no* scopolamin-morphin injections were used on the mother, she became confused in mind, did not observe the birth, and asked if the doctors were going to perform an operation; apparently her memory had had an interruption *without* the use of scopolamin. It would be an interesting study to find out how often this is the case in entirely spontaneous births.

"To illustrate the hallucinations caused by scopolamin, I will give the following answers made by a mother:

"Question: 'Why do you cry?'

"Answer: 'Because I have no work.'

"Q.: 'What is hurting you?'

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"A.: 'The pastry.'

"Q.: 'Who am I?'

"A.: 'The barber.'

"Q.: 'Where is my barber shop?'

"A.: 'In the Zöllnerplatz.' Afterwards she added: 'Frauenklinik.'

"Q.: 'What did I show you just now?'

"A.: 'Hats.'

"Q.: 'Have you a child?'

"A.: 'Yes, the baby should be baptized.' Then she complained loudly: 'I can't stand it any longer. Is it not over yet?'

"Q.: 'What is the matter?'

"A.: 'Income.' Then she added: 'Dresden Altstadt' (a suburb of Dresden).

"Q.: 'What is hurting you?'

"A.: 'Down my neck and finger tips.' She complained and cried loudly when the child was born: 'Oh, that hurts!' Afterward she has no memory of anything!

"To make a résumé of the first 300 and the last 20 cases, we find that in many cases scopolamin-morphin does not show the desirable effect of obliterating the suffering of pain at birth, or the facilitation of the act of birth by producing a state of sleep, although it leads to a lessening and dulling of sensitiveness in a minority of the cases; on the

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other hand, in the majority of the cases, unfavorable effects are produced by diminution of labor action down to entire stoppage, variation of the infant's heart sounds, oligopneic or apneic condition of child, and often an increase of sensitiveness to pain, unrest, and confusion of mother with hallucinations to the point of delirium. We cannot, therefore, recognize the use of scopolamin-morphin in obstetrics as described by Gauss, but we think (1) the effect of scopolamin-morphin does not obtain the object aimed at; (2) it is not without danger to mother and child; (3) it is not to be recommended in private practise, especially because the doctor must be present every moment on account of the incalculable side effects of the drug."

I have felt it necessary to give extremely exhaustive accounts of the failures of Hocheisen and Steffen, for the reports of these two obstetricians are still to-day the most largely quoted by all authorities who desire to prove a case against Twilight Sleep.

Hocheisen's failure is easily explained by a close study of his careless technic, but Steffen's is not to be dismissed. I have reread the Steffen report five times since my first translation of it from the German, hoping each time that I might find some explanation for his failure in an oversight somewhere

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of the Gauss instructions, or in a miscalculation of dose.

Steffen leaves himself open to criticism on this point: He states that eventually he did not give the injections until "it was only a question of a few contractions to expel the child." Under the circumstances it could certainly be argued that he could not possibly then have had time to establish a Dämmerschlaf at all, which would easily account for his statement that in many cases "scopolamin-morphin does not show the desirable effect of obliterating pain at birth."

Furthermore, many obstetricians warn against making the injections too soon before the actual birth, as in that case the child is very apt to be impregnated with the drugs transmitted from the mother to child through the placenta and is more liable to be born in an oligopneic condition.

Still another point; Tichauer says: "Gauss has clearly indicated that absolute painlessness is not aimed at and when it occurs it oversteps the limits of Dämmerschlaf and indicates an overdose; yet we find that Steffen obtained painlessness (unconsciousness) in 45.8 per cent. of his cases."

Mansfeld says: "As soon as painlessness is aimed at there is danger of overdosing."

But aside from these few assailable points, after

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closest study of the Steffen report I can only say I am still convinced he gave the method a conscientious trial; his failure is therefore to be treated with serious consideration.

The only other important Continental reports of this year are those of Gminder, Bass, and Holzbach.

It does not seem necessary to give the report of Dr. Gminder,[3] as all value of his record as a criterion by which to judge the method is nullified by the fact that he in no way adhered to the rules of Gauss, either in regard to the dosage or the memory test.

He says: "Gauss has included a new factor by which to judge the stage of narcosis — the memory test. I may as well underscore right here that by 'sufficient effect of drug' I understand painlessness of labor without interruption of the progress of birth. I did not adhere to the memory test, as I wanted to find the best way in which the best results could be obtained without injury to mother and child."

Small regard for either mother or child was shown by Gminder in the amazing experimental doses indulged in by him. This record is one of

[3] "One Hundred Cases of Scopolamin-Morphin Narcosis in Obstetrics." From a speech made by Gminder of Krupp's Hospital at Essen, at the Society of Medicine at Essen, 1907.

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the best proofs ever furnished of the comparative harmlessness of scopolamin, for had this drug the deadly qualities ascribed to it by some writers, one cannot but believe Gminder's list of casualties would have been large.

As Tichauer says: "It is a marvel Gminder's results were not worse, and, to crown it all, old solutions were often used."

In only 20 cases did he make the slightest pretense of adhering to the Gauss dose; in the other instances he kept varying the dose with and without morphin in groups of three, five, eight, or eleven patients, employing in each group an entirely different technic. Yet Gminder has the effrontery to bunch the results of all these dissimilar experiments under one head and give them as the record of *an* experiment with the Gauss Dämmerschlaf.

After such reckless experimentation it is astounding to find that out of his 100 cases he reports 58 satisfactory births.

Gminder's report really constitutes a sort of scopolamin-morphin vaudeville.

The use of the term "*semi*-narcosis" in Dr. Bass's[4] title is significant and indicative of his careful observance of rules.

[4] "One Hundred and Seven Births under Scopolamin-Mor-

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Of the operations necessary in his cases, Bass declares "not one was directly or indirectly connected with the narcosis."

As to the length of birth, he says: "Although there was no case where protraction of birth could not otherwise be sufficiently explained, still it seems to me that scopolamin-morphin influenced the process of birth if but only slightly. However, intermission of labor will happen in all protracted births."

Bass's report is particularly just and lacking in prejudice or conclusive opinions, as he says, "the publications on this narcosis vary so greatly as to the value of the method, it is as yet impossible to form a definite opinion." His own experience nevertheless was decidedly in favor of Twilight Sleep.

Holzbach [5] at this time made interesting experiments to answer the following questions:

(1) Is scopolamin excreted or is it still circulating in the body of the child?

(2) Does it still circulate in the body of the mother?

phin Semi-narcosis," by Dr. Oscar Bass of the Crobak Clinic, Vienna. *Münch. Med. Woch.*, 1907.

[5] "About the Relations of Scopolamin to Child During and After Birth," by E. Holzbach. *Munich Med. Journal*, 1907.

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(3) Is it introduced into the child through the mother's milk?

Chemical test was not found to be sufficient, so Holzbach had to make the more sharp physiological experiments.

"After ascertaining the smallest quantity of scopolamin which would dilate the pupil of the eye, I then took milk from the mother, who had received injections at birth, and instilled three drops of this milk into the human eye. These experiments, as well as those made with the urine of the new-born, did not prove the presence of scopolamin."

He then followed with experiments upon the much more sensitive eye of the frog and proved the presence of scopolamin in the mother's milk. Holzbach thereupon comes to the conclusion that scopolamin is still present in the mother during the first few days after birth.

The urine of the child immediately after birth showed the presence of scopolamin, but it was found to have been excreted through the kidneys after one quarter of an hour.

Salzberger,[6] commenting in 1910 on the Holzbach tests, says:

[6] "On Danger to Children from Scopolamin-morphin Administered During Birth," by Dr. Max Salzberger of Kulm. Inaugural Dissertation. Published 1910.

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"If this small quantity of the drug proved to be present in the mother's milk up to the third day, were injected hypodermically, it would produce no effect upon the child, how much less effect then could it have when taken internally."

Of all the sixty-nine reports on Twilight Sleep gathered from world-wide sources, no report has given me quite the thrill of pleasure which that of Dr. Birchmore of Brooklyn, N. Y., produced.

It is especially significant that this report was published in June, 1907, at a time when it took a brave man to sound the praise of scopolamin-morphin in the States, for it was at a period when only a few other American physicians were making timorous experiments with these drugs with general resultant failures, after which the method was quickly discarded and damned. In view of all this, I think the women of America should feel a vast and deep gratitude to Dr. Birchmore and his name should be handed down among them as the American pioneer of Painless Childbirth and the first champion of the cause of Twilight Sleep.

My attention was drawn to this report in Germany where it is a prized contribution to the cause of Twilight Sleep; my first transcription of it was from the excerpts contained in the reviews of the

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record in the German medical journals, but after my return to England I got the report in its entirety at the library of the British Medical Association.

Dr. Birchmore's opening words are:[7]

"Since the rediscovery of the condition under which the deep sleep resembling death in its soundness — of which the tradition has come down the ages — could be procured, men in various parts of the world have made use of it to obtain insensibility to pain."

He continues in speaking of scopolamin (or hyoscin):

"I believe, as a statement of the conditions, in fact and in practise, on which that great improvement in the obstetric art for which we have long been looking may reasonably be grounded. The actual results which have been attained may be summarily stated in a few words: the patient slept, labor came on, and progressed in accord with usual conditions, normally in relation to the details.

"The labor was not prolonged — far otherwise and in no case was it needful to use an anesthetic, although the forceps was used thrice.

"The only case in which the mother showed any

[7] "The Hyoscin Sleep in Obstetric Practise," by Woodbridge Hall Birchmore, M.D., Brooklyn, N. Y., 163 Fulton Street. *Medical Record*, Vol. 71, June, 1907.

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signs of awakening was not one demanding interference."

How delightful to read the following concerning the babies:

"No results influencing the infant unfavorably were observed, although most anxiously looked for."

Dr. Birchmore's dosage was as follows:

"The hyoscin (or scopolamin) was administered in doses of $\frac{1}{100}$ of a grain + $\frac{1}{4}$ of a grain of morphin and cactin $\frac{1}{67}$ of a grain. This amount was given in solution of 1 c.c. of water and repeated as required."

The quantity most usually employed for the first injection by the British doctors to-day is very nearly that given by Dr. Birchmore, the British doses generally being $\frac{1}{100}$ of a grain of scopolamin to $\frac{1}{6}$ of a grain of morphin.

One one-hundredth of a grain equals .00065 g. and $\frac{1}{6}$ of a grain of morphin equals .01 g. morphin; which, you see, makes the British doses practically the same as those employed by Gauss.

Dr. Birchmore says much stress should be laid on the purity of the ingredients, for obvious reasons; it being of special importance when so small a dose of scopolamin is used that the most absolute purity be attained.

"The first dose was given as soon as the first

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stage of labor was certainly beginning and was in most cases sufficient to hold the patient until the so-called impulsive pains were distinctly pronounced."

Dr. Birchmore employs the Gauss memory test, for he says:

"The instant the patient began to show the least evidence of perception, the second dose was given. In the cases requiring the forceps a third dose was given in two instances but not in the third case."

It is interesting to find the uniformity of effect upon the patients noted by Dr. Birchmore, for he says the patients did not show the variation which might in some cases have been expected, the results being the same as far as the depth of sleep and the continuance of it was concerned, nor did he find that the injections had a cumulative effect upon the mothers.

In one group of cases the average duration of the nap was six hours, while in another group the sleep continued for eight hours, from the time the second injection was given.

He tells an amusing case of one woman on whom the injection had the peculiar apparent effect of causing great activity on the part of the unborn child.

This mother repeatedly declared:

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"This child kicks something awful!"

The child continued to behave in this recalcitrant and impolite manner for four hours after the injection was given. The mother then slept for five hours and she said on awakening that the child had ceased to kick, but in a few hours the boy recommenced his exercises and continued to cause his mother discomfort for some time.

The mother humorously remarked to the doctor: "If he is such a kicker all his life, he will make lots of trouble."

The patient having received a second injection at the beginning of real labor then "slept until after the birth of her child, becoming somewhat restless at the end but not regaining consciousness until after the baby had been cared for and all provisions made for the comfort of the mother."

In one case the baby was born sleepy, but Dr. Birchmore says proof that the drug caused this condition was not positively established.

"All direct evidences of long continued interference with the actions of the child after birth is wanting and in only one instance was an effect upon a child positively affirmed by another doctor attending.

"Apart from the influence upon the direct progress of the labor, the effect upon the mother was

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most noteworthy; first, as quite hindering the mental disturbance which pain and suffering in all cases produce." This is indeed a noteworthy fact and one on which Dr. Krönig has always laid such stress.

The next sentence of Dr. Birchmore is of the greatest interest to mothers; he says one physician remarked after using scopolamin-morphin:

"Objectively, as evidenced by the mother's condition, it appeared a preposterous proposition to say that she had given birth to a child."

Another very important point is the lack of resistance in the mother to the efforts of nature to expel the child. Quieted by the narcotic, and mentally without apperception of the agony of the workings of the expulsion muscles, she makes no effort to check the full force of the contractions of those muscles.

To quote Dr. Birchmore: "The mother shows no signs of exhaustion, and although the passive resistance of the tissues must be quite the same, it can be clearly seen that no spasmodic resistance, by inhibition due to pain, in any way interferes. This absence of the active resistance is perhaps the most remarkable effect produced."

As an example of the beneficial results of muscles working independently of mental suffering, he tells

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of one mother who, after a labor that had been notably tedious, was delivered of her fourth and largest child in less than two-thirds of the time of the *shortest* of her former experiences in childbirth, and in one-third the length of time of her longest. She had always in former births been peculiarly restless and difficult to manage, but with scopolamin-morphin she "simply slept through the whole series of phenomena; she did not awaken until she had been removed to a clean bed and provided with all things needful."

Now read with deliberate care the revelations contained in the following: "At the birth of the head, although soundly sleeping, she made certain spasmodic actions and changes of position which caused some surprise to the nurses and attending physician."

Dr. Birchmore's conviction is that the following statements of the physician conducting this birth contain an important truth; they are: "Her actions showed that combined movements should occur which are inhibited" (prevented) "in the large majority of cases. It was as if I had seen the natural action of a woman for the first time."

Telling of the amazing cooperation of the patient in Twilight Sleep, Dr. Birchmore cites two cases in which the mother "rolled on to the left side, partially

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flexed the left leg upon the thigh and the thigh upon the pelvis so that the child was or rather would have been supported and guided on to its back by the act of extrusion. The right lower extremity extended to the extreme, the toes pressed against the foot of the bed gave a 'fixed point' for the muscular leverage."

My only experience in midwifery has been with my goats — I formerly had a flock in Bermuda — and Dr. Birchmore's above description is a perfect description of the phenomena of nature in the second and third deliveries of kids by my goat mothers.

The first time a goat bears kids she suffers too intensely for the normal action of nature, but in the second and third set of kids the leg is flexed just as Dr. Birchmore describes in his human patient under scopolamin-morphin and the attitude of the mother-goat is precisely that which was evidently originally planned by nature to be the one taken by women in order that the child should be expelled correctly.

Dr. Birchmore says in the majority of cases "the heels were brought against the buttocks and in these cases the muscles were made tense, lifting the buttocks completely off the mattress at the instant of birth of head, yet there was no sign of awakening.

"The steady, slowly increasing and tremendous

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force exerted by the abdominal muscles during the expulsive pains attracted the attention of all observers. One who has seen great numbers of labors said that he never saw anything like it before, and added, in an extended opinion, that the great advantage over chloroform is easily seen, in that with the hyoscin (scopolamin) sleep reflexes are greatly augmented, not suppressed.

"All who have made use of hyoscin a few times appear to regard this restoration of the truly natural conditions as being of almost as much importance as the unconsciousness from pain.

"'If we use hyoscin the mother cannot do mischief by her own excited and voluntary or semi-voluntary actions,' is a remark made by every user."

As to rupture of the perineum (the space between the lower termination of the rectum and the vagina), Dr. Birchmore says proof is wanting of this danger. One doctor said:

"The rupture of the perineum, when not due to the haste of the accoucheur" (the obstetrician), "is due to the excitement of the mother.

"From what I have seen I am inclined to regard the dilatation of the perineum much as I regard the dilatation of the uteri" (womb). "It is gradual and the obstruction, although usually needless now, must have been of importance once. The waking

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mother (without scopolamin-morphin) makes convulsive efforts to overcome the resistance of the perineum and when she feels the obstruction, has a titanic if not tetanic spasm to force the head by, and then the shoulder (of child) catches. But in hyoscin sleep the first perineal pains are not convulsive, and instead of one or two ineffectual attempts, ending almost in a convulsion, the sleeping woman has a dozen small pains gradually stretching the sphincter" (the circular muscle which opens and closes) "and besides this the head is not held so firmly against the sphincter, or rather against the fold of sub-mucous tendon, that this cannot roll and after once or twice trying the whole apparatus — tendons, muscles and mucous membrane — slips out of the way and the last expulsive pain comes on.

"For my part I regard this use of hyoscin as important because it has restored the conditions of normal labor.

"I know my expression is bad," modestly declares Dr. Birchmore, "but, somehow, hyoscin gives the management of labor back to the reflex ganglia from which the brain in women had taken it away."

As for the forceps cases, he says: "Certainly the use had no connection with the insensibility of the patient. All who have made use of this narcotic, without any exception, insist that exhaustion,

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even to a small degree, is hardly to be perceived. The absence of excitement, the regularity and above all the maturity of the expulsive efforts, the fact that none of the vitality of the mother is expended in useless and exhausting (because ineffectual) and disorderly efforts, promises to lessen greatly surgical interference — the special interference demanded by the mother's state.

" The importance of the hyoscin sleep in obstetric practise is amply demonstrated, and experience shows that it can give us all the aid, in quieting the patient, that any narcotic can give, and in addition it gives us a practical anesthesia of prolonged duration and gives this anesthesia without risk to either mother or child. Furthermore this: we have the most abundant proof that this practically anesthetic sleep is quite without danger, because the respiratory system is in no way interfered with, nor is the heart action restrained. It is also clear that the reflex actions which find their point of departure peripherally" (from the outer surface) "and return to the periphery again from spinal and sympathetic system ganglia, specifically from the 'pelvic brain'" (so named by Byron Robinson) "are not restrained, but rather they are augmented by the action of this drug. Clearly, then, it is a drug sedative to the cerebrospinal axis, but not to the ganglia

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connected with the reflexes of common life. This fact alone is of no trifling importance, but the import grows when we note that in shutting the door, so to say, to the influence of the inhibitory actions, it leaves quite unopposed the influence of the sympathetic system, and the physician using it need have no fear of any accidents to disturb the normal evolution of a birth. It is, then, for the accoucheur the ideal anesthetic, one which, so far as we yet know, he can use to obtain the desired effect without fear of an overdose. So far as I have been able to learn, no one has yet had any experience with excessive doses."

What must Hocheisen, Gminder, and Steffen have thought when they read that!

"We certainly know that all we need to give can be given without risk or danger.

"Finally, and perhaps of all the most important, this use of hyoscin has stripped motherhood of its horror.

"The dread of pain has been the great dread of the coming birth; until this discovery the 'pains of maternity' remained a horrid and incontestable truth, but these have vanished and the exhausting ordeal of motherhood is gone to be seen no more."

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This is by far the most important document concerning Twilight Sleep which has yet been written.

It is a mystery why its convincing truths did not stir all American physicians to experiment with scopolamin-morphin; it is, furthermore, amazing, after such successful results as those obtained by Dr. Birchmore, that American mothers, kept utterly in the dark about this important discovery, should have been forced to go abroad to find relief in a German Frauenklinik from the agony of childbirth.

THE MOST SALIENT FACTS OF DR. BIRCHMORE'S PAPER ARE:

1. With the entry of scopolamin-morphin "the pains of maternity have vanished to be seen no more."

2. These drugs form "the ideal anesthetic."

3. "This anesthetic is without risk to either mother or child."

4. All who have used this method "without any exception insist that exhaustion even to a small degree is hardly to be perceived."

5. The danger of perineal rupture is done away with.

6. Scopolamin does not prolong the birth process —"far otherwise."

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7. " No results influencing the infant unfavorably were observed, although most anxiously looked for."

8. That in Twilight Sleep there has been a " restoration of the natural conditions "— this last is the most remarkable and important feature of all.

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The Remarkable Reports of 1908

KRÖNIG

THE most important publication of this year was the report of an address made by Dr. Krönig,[1] director of the obstetrical department of the Freiburg Hospital for diseases of women.

The entire present scopolamin-morphin method is due to Dr. Krönig's determined efforts — first at Jena and later on at Freiburg, where his assistant, Dr. Gauss, eventually perfected the Dämmerschlaf under Krönig's direction.

As Dr. Krönig stands sponsor for Twilight Sleep, many would perhaps like to know something about his history.

He was born on the 27th of January, 1863, at Bielefeld, Germany. After attending the gymnasiums (classical schools where Latin, Greek, etc.,

[1] "Painless Delivery in Dämmerschlaf," by Bernhardt Krönig, Ordenlicher Professor, Geheimrath, M.D. *Deutsche Med. Wochenschr.*, No. 23, 1908.

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are taught) at Bielefeld and Dessan, he then attended three universities — Heidelberg, Kiel, and Berlin.

His professional career is as follows: he was first appointed assistant to Professor Pagenstecher at Elberfeld; his next work was under Professor Hoffa at the Private Orthopedic Clinic at Würtzburg, then in the laboratory of the Berlin Gynecological Hospital; his fourth position was at the Koch Institute and from there he went to the Leipsic Gynecological Hospital.

At Leipsic in 1896 he was appointed Private-Dozent (authorized lecturer). There is in Germany a half-way stage between lecturer and sure-enough professor, which is called "Ausserordentlicher Professor," but in Krönig's case he was promoted direct from lecturer to "Ordentlicher Professor" (the highest kind of professor) at Jena in 1903 and again at Freiburg, at the Ludwig Albrecht University in 1904.

Dr. Krönig is the author of many books on gynecological subjects.

So we see that the man who is responsible for the scopolamin-morphin narcosis as used to-day, is a man of the most distinguished attainments, and the highest professional standing.

In appearance he is a great blond giant with an enthusiastic profile. Kindliness radiates from all

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his great frame. He has not one hardened emotion.

He shed tears of sympathy over a young American girl on whom he had found he must perform one of the most serious operations in the world.

The Steffen report and the violent discussion which followed between Krönig on the one side and Steffen and Leopold of the Dresden Royal Frauenklinik on the other, at the Seventy-ninth Meeting of the German Naturalists and Doctors, was so taken to heart by Dr. Krönig that he was actually made ill and was confined to bed for several days.

It is not surprising to find this giant of the tender heart fighting so long and against such perpetual opposition for the relief of women's suffering.

As I sat in his private office I felt that the room was an expression of the man — it is all in gray and gold; gray walls, floor and doors, curtains of pale gold, table cover of gold; on the walls are three steel engravings, one small painting and one framed autograph; two bronze figures — one that of a blacksmith; a mahogany desk and a couch covered by a beautiful fur skin — this is the room to which women have come from every part of the world to see the man who could promise them relief from the torture of childbirth.

This publication of Krönig's is notable as being

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his only paper on the subject of scopolamin-morphin, and his only reply to the opposition.

Krönig points out that scarcely any physician would be able, after only a few trials, to obtain the same results which have been achieved at the Freiburg Frauenklinik after long experience. It is therefore unfair to decry the method as a failure, if the Gauss results are not obtained by others in their early attempts; they should, on the contrary, make further unprejudiced study.

" It must not be forgotten that it was only after a study extending over many years that we ourselves succeeded in obtaining our present success. The method demands concentrated attention on the part of the obstetric staff.

" Thanks to the generosity of the Grand Duke of Baden we have now been able to triple the obstetric staff in the delivery ward and this has enabled us to perfect our method, giving it the widest possible application to all classes of the population.

" I mention this intentionally," says Krönig, " because I am of the opinion that in hospitals with a large number of cases, our procedure can only be employed with any prospect of success when a complete administrative reorganization in the assignment of duty in the delivery ward, has been effected.

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"If, as is the case in large hospitals, the doctor on observation duty is relieved every twelve hours, the colleague who follows him will not be sufficiently well informed as to the condition of the various cases in labor, and failure is certain to ensue.

"Consequently I do not consider it the result of chance that it is precisely in small hospitals that our method has been successfully adopted. It is also significant that in the large hospitals of Berlin and Dresden, where there are many thousand births a year, our procedure has proven a failure.

"This is easy to understand when we remember that the surroundings of the patient have an importance which should not be underrated. Sense impressions, loud noises, bright lights, all disturb the half consciousness."

At the time Krönig wrote this paper, there had been fifteen hundred births under scopolamin at the clinic. In all that number only one mother died and when one reads the circumstances of the death it would seem as if even the most biased opponent could scarcely attribute it to the narcosis.

Here are the details: The patient was a woman with narrow funnel-shaped pelvis. Very soon Krönig saw that Cæsarean section was absolutely imperative. The husband of the patient absolutely refused to consent to this operation, and while

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Krönig was still urging the necessity, the uterus ruptured; even then Krönig declared to the husband that his wife might be saved if he would permit an operation, but that permission still being withheld the woman bled to death.[2]

As for the duration of birth, Dr. Krönig says: "It is either not increased at all by scopolamin-morphin or else increased to a quite negligible extent. But even if, in a number of cases, the observation should show the birth prolonged by perhaps a half hour, I believe this consideration cannot possibly be seriously allowed to outweigh the great blessing which we confer on the mother by eliminating her pain.

"One can only form an idea of the blessing of the method by hearing the statements of women who have borne children without anesthesia.

"In the whole course of my career as a physician never have I harvested such a crop of gratitude as I have since I established the Dämmerschlaf in deliveries."

Now that many of Krönig's and Gauss's opponents began to acknowledge that the method held safety for the mother, they took refuge in the objection that it was dangerous for the child.

Krönig refers to the tests made by Holzbach

[2] This obdurate husband — an Italian — "emphasized his

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(which we have already given) and says that they prove that even though scopolamin is shown to be present in the child in minute quantities, these tests also prove it to be eliminated from the child's organism in a very short time.

When Krönig's paper was written, the oligopneic condition of children at the Frauenklinik had been reduced to 10 per cent. "We prefer to wait quietly for the child to breathe naturally of its own accord, but if one desires to produce rapidly regular breathing, nothing beyond simple mechanical stimulus is necessary.

"The fact that the mortality of our children, both during and after birth, has been decidedly diminished since our use of scopolamin-morphin, refutes the prophecy that the mortality of babies would be increased by the oligopneic condition leading to asphyxia.

"The last objection brought forward is that the child will later on be injured by scopolamin passed to it from the mother. Out of 305 births in our private wards we have been able to trace the greater number of children and we can absolutely refute the expectation, expressed in some quarters, that the children would display a higher death-rate during

determination upon the assisting doctor," said Dr. Krönig, "by means of a knife which he held in his hand!"

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the first year of life. We can also prove their later physical and mental development to be absolutely normal.

"As for the objection now brought forward by our opponents, who find themselves driven into a corner, viz.: that the deleterious effect of scopolamin will only show itself in the mental development at the age between twenty and thirty, we cannot but feel that this shows what unfair standards are applied, when it is a question of opposing a new method.

"This is the more salient when we remember that obstetricians practising among the better classes use forceps in almost every other case and consequently in all these cases must employ anesthetics — chloroform and ether — the transmission of which, from mother to child, has been proven.

"In addition to this, take into account the not inconsiderable injuries often inflicted on the brain of the child by the forceps. In hundreds of cases the forceps cause subdural hematoma and a pressure inward on the skull.

"When we consider all this we are compelled to ask in amazement why it occurs to no one to draw attention to the fact that the brain action of the child is injured in these innumerable forceps operations, while it is being maintained that extremely minute

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quantities of scopolamin (which have been proven by Holzbach to disappear shortly after birth) influence the brain action of the child up to an advanced age!

"It is important to say here that even in our private wards we have not used the forceps for the relief of pain on a single occasion since the introduction of the scopolamin-morphin method."

THE KLEINERTZ REPORT

Kleinertz, of Stüttgart, studied the scopolamin-morphin method for one year in Freiburg under Dr. Krönig; the results of his experiments are therefore of particular value.

That the Dämmerschlaf is now (1914) a permanent institution in the Stüttgart hospital, is of even stronger significance than this report, which only deals with the first experiments in 280 cases.

Kleinertz says:[3] "As many others have pointed out the harmfulness of scopolamin-morphin, I wish to state that by strictly observing the Gauss instructions we did not have any untoward incidents."

In each case before giving injections he examined

[3] "Childbirth in the Scopolamin-morphin Dämmerschlaf," by F. Kleinertz of the Stüttgart Hospital. *Zentralbt. f. Gynäk.* Liepzig, 1908, XLII, 1387-1391.

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the heart and kidneys of patients, but he does not regard slight heart disturbances as a counter indication.

In some of his earliest cases he used a mixed narcosis, employing chloroform when the head appeared.

He adhered to the Gauss initial dose of .00045 g. scopolamin, but gave .015 g. morphin. The second injection was made after three-quarters to one hour, "always conscientiously testing the memory of patient."

He found it important not to inject more than prescribed by Gauss in first dose or else weak labor would be occasioned. "For this reason the first injection requires absolute attention on the part of the obstetrician. The heart sounds of the child during period of expulsion must also be watched very closely. For this reason the method is only adapted to the clinic."

Out of 280 mothers he succeeded in putting 213 in Dämmerschlaf. Fourteen times no result, on account of too rapid birth. Nineteen times no Dämmerschlaf was attainable. "There were 29 cases of necessary forceps, caused by conditions which had nothing to do with the use of scopolamin."

Further on Kleinertz says: "There is no doubt that a diminution of labor may occur, especially if in-

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jections are given in too quick succession, or too early, or when the dose is not properly calculated. If a strong injection is given during the period of expulsion it is often noted that scopolamin, acting too violently, affects the muscles unfavorably; for this reason the method requires especial care, attention, and judgment during the period of expulsion." [4]

With regard to the length of birth, Kleinertz found it averaged, in the case of mothers bearing their first child, nineteen hours and forty-five minutes. In other cases thirteen hours and nineteen minutes.

In the 280 cases there were 282 children. Four babies which were delivered by forceps died; five died after birth " for various reasons not connected with scopolamin. The majority of the children were born in a normal condition, only a few were oligopneic and a few asphyctic.

" Aside from complaints about thirst from dryness of throat and mouth, no harmful influence upon the mothers was noticed. No evil after effects were observed.

" In one case we desisted from further injections because of pronounced heart disease of patient; yet,

[4] This may explain some of Steffen's failures, for we must remember that he did not begin his injections until this critical period had arrived.

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nevertheless, we obtained a lessening of the pain. None felt ill afterward."

The average blood loss of mothers was found to be 502 g. Good contraction of the uterus. Scopolamin did not affect the nursing capacity of patients.

"Mothers who had previously had children without scopolamin were the best test of the beneficent effect of the Twilight Sleep; these declared their after state of health, after birth under scopolamin-morphin, much better in comparison with former births."

The children's after health was found in no way to be affected.

Kleinertz exceeded the famous Gauss maximum dose of .00375 g. scopolamin + .03 g. morphin given in fifty-seven hours, by giving one patient twenty-one injections in twenty-nine hours, the total amount reaching .00585 g. scopolamin + .01 g. morphin, and yet had no bad results.

"The only difficulty of the method lies in the chemical instability of scopolamin, which makes it sometimes necessary to throw away freshly made solutions." Of course this fault has now been practically eliminated by the invariable scopolamin of Professor Straub.

Kleinertz concludes this report of his entirely satisfactory experiments, by saying: "If the ob-

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stetrician and his staff will give their time and great pains to follow strictly the rules laid down by Gauss, they will then have a method which obtains its object of decreasing the suffering at birth without danger to mother or injury to child."

H. Kionka, of Jena,[5] now made physiological experiments with scopolamin with the result — as I have stated earlier — that he declared scopolamin was not injurious to the muscles of the heart.

He feels that he can establish two salient facts, viz.:

1. Variation in scopolamin's physical action does not mean variation in its effectiveness.

2. There exists great difference in the reaction of individuals to the drug.

MAYER [6]

Professor Stoeckel, head of the University Frauenklinik of Marburg, gave his assistant, Dr. Mayer, a chance to study the Freiburg method under Gauss, and Mayer reports on fifty cases afterward conducted by himself.

[5] *Therap. d. Gegenw.* Berlin. 1908. No. 1, pages 11-17.

[6] "Scopolamin-morphin at Birth," by K. Mayer, assistant at University Frauenklinik at Marburg, A. L. Published in *Zentralblatt für Gynäk,* 1908. Liepzig. XXXII, pages 689-699.

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He waited until the child's head was firmly in the pelvis to avoid too long a duration of the Dämmerschlaf and the necessity for giving too large a dose.

Mayer thinks all secondary effects are to be attributed to the decomposition of scopolamin — a disadvantage now done away by the Straub preparation. For this reason Mayer carefully tested all scopolamin before using, by the Kessel test of 1 per cent. calcium permanganate.

His first injection was only .0003 g. scopolamin + .01 g. morphin in separate injections.

" The task of the obstetrician," he says, " is now to calculate the dose in each case, so that, on the one hand, not too little scopolamin is given — as then no hypalgesia can be obtained — and, on the other hand, to avoid too large a dose which would result in complete narcosis."

In his fifty cases only twice were the labor pains diminished, and " even in those instances it cannot be said that scopolamin caused it."

A nurse measured the duration of all pains by holding one hand over the abdomen, while keeping time by the watch. " Only by such a test can a definite opinion be formed."

He found that when the patient still complained

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about suffering in spite of being in a state of Dämmerschlaf, the cooperation of the abdominal muscles was considerably greater.

"Toward the end of the birth period the patient often has to be energetically urged to cooperate. It might be supposed, in a case where the head takes long in passage, because of lack of cooperation on the mother's part, that there would be indication for the use of forceps because of danger to the infant's life, yet among our fifty cases we had only *one* such case.

"The violent hemorrhages ascribed by others to scopolamin were not observed by us. In thirty-five instances there was a loss of blood up to 500 g. In no instance did we have to use tampons."

I want to draw your especial attention to the following statement of Mayer, as I believe it to be of great importance.

"We noticed a greater loss of blood in the cases where, because of the rapid expulsion, the first injection had only just been made. Where the scopolamin had been acting for some time the blood loss was less."

Of the side effects, Mayer says that sometimes the patient became excited by scopolamin and wrestled with the nurse who was trying to protect the pe-

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rineum from tearing, so that it was impossible to guarantee complete asepsis (exemption from blood-poisoning or disease germs).

He had one case where the woman showed strong idiosyncrasy for the drug and behaved madly after .0005 g. scopolamin had been injected within three and a half hours — a very small dose. She was in a deep Dämmerschlaf, and in spite of having to be held by several persons during birth, half an hour after birth she came to and did not know she had become a mother.

Another disagreeable feature noticed by him was painful thirst. "Often the only word uttered by patients who awaken during pains is 'water,' which they repeat over and over." He had only two cases of moderate vomiting.

No after effects lasting until the following day were ever observed.

There were three oligopneic children, and Mayer describes their condition as follows: "The children appeared rosy and fresh, their heartbeats somewhat slow, but they did not cry, the breath was so superficial that no respiratory movement could be seen; once in a while they opened their eyes. This condition need not create any anxiety in the spectator, as perhaps a minute or two later normal breathing sets in."

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In the case of these children, Dämmerschlaf had had to be attained in from three and a half to twelve hours.

There was one apneic child (that is to say, a deepened state of oligopnea). In this birth — one of difficult extraction —.0016 g. scopolamin + .02 g. morphin had been given within six hours. "This case," says Mayer, "characterizes the narcotic effect of large doses of scopolamin upon the child's breathing center."

As Gauss has pointed out, an oligopneic child always indicates a miscalculated overdosing of the mother. As the technic of the doctor improves, the per cent. of oligopnea is correspondingly lowered.

In Mayer's cases, forty-five children (90 per cent.) were lively, and no abnormal behavior on the part of the babies, during their first days of life, was observed.

To make a résumé of Mayer's 50 cases: In 23 he obtained complete Dämmerschlaf. In 21 hypalgesia. In 6 cases no effect.

He explains his high per cent. of hypalgesia (partial painlessness) by saying: "In these cases we tried to obtain results with as small doses as possible, also in many instances the period of expulsion was so short it was impossible to make the repeated in-

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jections necessary for attaining a state of Dämmerschlaf."

Mayer agrees with many others that the use of the drug in obstetrics can only be carried out in clinics where there is continuous superintendence of the patients by doctors.

He ends thus: "We may describe the method as a very remarkable attempt to lessen the suffering of women at birth, and we must fully recognize the merit of those who have taken great pains to develop Twilight Sleep, but we are, however, of the opinion that the scopolamin-morphin method does not quite attain its object, viz.: the reduction or abolition of pain at birth, and that the application of the injections is bound by too narrow time limits."

After having attained complete painlessness in 23 cases and lessened pain in 21 (making 44 cases of reduced pain in 50 births), it seems rather inconsistent for Mayer then to say the method fails in its object of lessening pain.

"The disagreeable side effects," of which Mayer had so few to relate, he considers "against the method's unreserved recommendation."

He concludes his report by announcing that he has a new method on which he will report very soon!

In spite of Mayer's final opinion, one cannot but

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feel that his small record must be placed on the credit side of the scopolamin-morphin annals.

MANSFELD [7]

O. Mansfeld, of Budapest, studied the use of scopolamin at the Freiburg Frauenklinik, and it is pleasant to remember that the Dämmerschlaf is to-day permanently established in the Budapest hospital.

Mansfeld feels that one cannot gain a clear idea of the technic of this method from Gauss's publications; personal study is necessary.

He gives a very clear and detailed account of his manner of dosage, which I will reproduce in the hope that it may be helpful to other experimenters.

"First injection: .00045 g. scopolamin + .01 g. morphin if spontaneous process of birth is to be expected and vigorous labor occurs every five minutes. Second injection: .0003 g. scopolamin one hour later, using the memory test after a half hour. If, after a further thirty to sixty minutes, no amnesia has occurred, a third injection is to be given one and a half hours after second injection. The narcotizing effect of second injection will not take place for

[7] From article published in the Vienna *Clinical Weekly*, No. 1, 1908, pages 17-19.

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a half hour and therefore cannot be noticed before one hour has passed; the memory test used before the third injection gives information as to the patient's condition a half hour previous."

He especially draws attention to the fact that Gauss does not wish to attain painlessness *and* amnesia but only amnesia. Actual painlessness is only obtained by overdosing and must therefore be regarded as dangerous.

"Conducting a Dämmerschlaf is very difficult and requires care and constant control, and can therefore only be carried out in special wards."

He found the birth process to be protracted by the use of scopolamin-morphin, because of its decreasing the abdominal action, "but without, however, necessitating any operative interference.

"The actual value of the method consists in attaining amnesia. The practical value consists in the promise which can be given anxious patients that they will remember nothing whatever about the birth afterward."

MATWJEJEW [8]

The succinct account of Dr. G. T. Matwjejew's experiments in Moscow makes one wish to know more of this cheerful Russian gentleman.

[8] From *Zentralblatt*, 1908.

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His results were altogether delightful.

Dr. Matwjejew insists that "scopolamin does not prolong birth; on the contrary, it often stimulates the pains of labor.

"The suffering of the mother decreases, often disappearing altogether. No kind of side effects were ever observed."

He disposes of the question of oligopnea without waste of words: "Children often born asleep, but pulse and respiration normal. They wake up after a while spontaneously."

Dr. Matwjejew goes into no details as to his technic or dosage, but his results are eloquent of satisfaction and conscientious method.

I have in this chapter given condensations of all the reports contained in the German medical journals for the year 1908. One cannot but feel that during this year the cause of scopolamin-morphin strode forward with three-league boots.

The mothers owe a vast debt of gratitude to Hocheisen, for his report undoubtedly caused all carelessness of technic to be eliminated from the experiments which followed in other hospitals.

Even Steffen's honest failure had its beneficial effect, for it caused doctors to realize the importance of going to Freiburg for a careful study of the

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method, before undertaking experiments of their own.

But for the mistakes of 1907, we should not have had the successes of 1908.

The most interesting and convincing thing about the reports of this year is that two of these records came from the hospitals of Stüttgart and Budapest, where now, after six years, the Twilight Sleep is still a treasured institution.

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XI

The Singular Metamorphosis of Scopolamin in Surgery

I AM sure that all those unfortunates who have had surgical operations retain in the memory the following especially dreadful impressions of the beginning and the end; the horror of the placing of the cone over the face, the sense of suffocation combined with the mental distress of the early stage of an inhalation narcosis, then the coming-to after the operation, the extreme pain which so often has to be lessened by morphin, the wretched nausea which frequently results in racking vomiting.

If these features could be eliminated I believe many of us would face the operating table with far more courage; that they can be avoided is proven by the following reports, and scopolamin is again the magic.

It is a most singular thing to find here the same loudly denounced "poison" used in operations in the same manner and the same combination in which it is employed in childbirth, and now find only its

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praises being sung as a "most humane and valuable drug."

We prepare ourselves to hear all the old familiar list of "side effects"— red face, increase of pulse, deleterious effect upon the heart and respiration, and vomiting of patient, but instead we suddenly find all these concomitant effects of scopolamin vanishing from the scene. We ask ourselves: is it possible that this is the same evil chemical of which we have heard so much abuse — this benign drug which we now find recommended over and over as a *preventive* of vomiting?

The question arises in our minds and will not be laid: "Why is scopolamin such a poison when used for the relief of women in childbirth and such a harmless and beneficent drug when employed in surgical operations?"

The inconsistency must strike the most thoughtless among us.

We who are begging for the adoption of Twilight Sleep for ourselves and all our sister women in childbirth, must arm ourselves with positive knowledge on the subject of this drug on which all our hope of relief depends.

That is the reason I have spent months in collecting for you all the information to be gotten on the use of scopolamin — information which you might

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not be able to find yourselves, for I know that not one mother in a thousand ever has an opportunity of seeing a medical journal, and even if she has she is generally too busy a person to spend time informing herself on questions which she believes belong only to the field of her family doctor.

You may think I am putting you to unnecessary trouble when I place before you the records of scopolamin in surgery and beg you to read them with the greatest care, but my reason is this: I want to prove to you that scopolamin is not the dangerous drug which some of the physicians have recently been declaring it to be — nowhere is that fact so proven as in the history of its use in surgical operations.

It seems especially appropriate to touch on this phase of the subject here, as many of the reports of 1909 deal with the use of scopolamin in mixed narcosis for gynecological and other operations.

In this chapter I shall gather together the important European reports of the year extending from 1908.

We first find Dr. Boesch [1] declaring: "We agree with Dr. Krönig that scopolamin is one of the most humane and valuable drugs."

[1] "The Value of Scopolamin-morphin in Gynecology," by Dr. Eugen Boesch. No. 4, *Zentralblatt.* 1908.

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Dr. Boesch is the assistant at the Woman's Hospital of Basel.

He continues: "The experience of our hospital has made us fast friends of scopolamin-morphin.

"Aside from our use of it in birth, scopolamin-morphin has been employed in 2,000 operations in our clinic without any bad symptoms being evidenced by the patients.

"Before every narcosis — chloroform-ether-oxygen — scopolamin-morphin has been given on principle ever since 1905.

"For the past two years we have also used it alone in minor operations, such as enlargements, incisions, and operations under local anesthesia.

"For one year on the eve of all large operations our patients receive first one gram of veronal which causes them to fall into deep invigorating sleep, then with the effects of veronal the later administered manner, causing the narcosis to take better effect.

"One hour before the operation we give a hypodermic injection of .0005 g. scopolamin + .015 g. morphin and induce an immediate strong desire to sleep, thus lessening the excitability of the reflexes.

"It is always possible to merge a scopolamin-morphin Dämmerschlaf without interruption, by

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chloroform-ether-oxygen, to the stage of deep narcosis.

"After the scopolamin-morphin injection the patients sleep quietly, agitation is spared, and they do not realize when the anesthetic is administered, the general narcosis creeping gradually upon them. With this method we need to employ much less chloroform and ether, which is a very important point.

"The Dämmerschlaf lasts long, extending over a period after the operation. When the patient awakens the first pain of the wound is much less than under ordinary narcosis; they also vomit rarely, but should there be any vomiting it is without effort and evil effect."

There are two very interesting reports from France.

Leon Durand[2] finds scopolamin of the greatest benefit in infantile surgery.

"It here has the same advantage it shows in operations upon patients of mature age, viz.: suppression of the fear of operation, diminishing of the danger of syncope, reducing the necessary chloroform to very small quantities, inducing quietude, etc."— now read with especial attention —"there is no vomiting,

[2] *Zentralblatt*, 1908.

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no dilatation of the pupils, no contraction of the abdomen, and lessened loss of blood."

These last sentences would seem to explode several well-established prejudices.

As for his dose, Durand gives it as 1.2 mg. scopolamin + 1.2 cg. morphin.

"The most favorable moment for operating is from one to one and a half hours after the injection."

Louis Dumont[3] finds that scopolamin injections render anesthetizing more easy and "insures absence of complications and vomiting."

The results of this mixed narcosis he found "far superior to those obtained by use of chloroform or ether alone, or in combination with chlorethyl.

"The usual agitation preceding chloroform is suppressed by scopolamin; it also prevents syncope at the beginning of narcosis."

One of the greatest advantages he states to be "painlessness after the operation; morphin rarely has to then be used.

"They sleep for five or six hours after operation and then awake without showing the toxical dyspnea" (difficult breathing); "of chloroformized patients.

[3] *Zentralblatt*, 1908.

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"Vomiting during operation never occurs; if it happens afterward it is neither violent nor long lasting.

"In over 300 scopolamin-morphin mixed narcoses only 43 per cent. even showed nausea.

"Artificial emptying of the bladder after operation was never necessary. No albumen was ever shown to be present in the urine. The quantity of urine was always above normal.

"Even after heavy operations patients may be given liquid nourishment on the fourth or fifth day, whereas after use of chloroform alone, it is generally necessary, in like cases, to wait until the eighth day, for fear of vomiting.

"In cases of debility or aged patients, the scopolamin is by far preferable. In all our cases of scopolamin-morphin narcosis there have been no deaths."

Dr. G. Blisniansky,[4] assistant at the Royal University Frauenklinik of Tübingen in Wurtenburg, reports on thirty-two cases in which she employed scopolamin-morphin on patients ranging in age from twenty-five to fifty-two years.

One case was complicated by extreme anemia, three had heart disease, three tuberculous affection

[4] *Zentralbt. f. Gynäk.* Liepzig. 1909. XXXIII, pages 301-306.

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of the lungs, and there were two patients with pronounced hysteria. These patients only required minor operations.

"At from one-half to one hour before operation we injected separate solutions of 3 dmg. scopolamin + 1 cg. morphin. In three-fourths of our cases we obtained hypalgesia, in the remainder amnesia. When in rare cases the temperature rose, it was not the fault of scopolamin, as it was afterward found to denote the beginning of a complication.

"No influence by scopolamin upon the pulse takes place."

The most amazing statement made by Dr. Blisniansky is that nearly all patients got up within twenty-four hours after operations.

From British doctors we have equally good reports.

Leedham Greene[5] says the advantage of scopolamin-morphin injections before inducing general narcosis are:

"Much less chloroform and ether will then be required.

"Patients sleep quietly for several hours after operation.

[5] At the Seventy-seventh Annual Meeting of the British Med. Asso., Belfast, 1909. *Brit. Med. Jour.*, 1909, II.

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" Scarcely any vomiting after operation.

" The method is less risky than narcosis without scopolamin-morphin, and superior to analgesia of the spine."

H. Torrance Thompson and Dennis Cotterill[6] find the advantages of this method to be:

1. As patients are calmed and have no fear, shock is avoided during operation.

2. Because of the action of scopolamin upon the salivary glands there is a beneficial lessening of the secretion of saliva during narcosis.

3. The quantity of chloroform or ether necessary to induce narcosis is very small.

4. Vomiting during or after operation becomes rare and is never serious.

5. After operation the patient usually enjoys a good sleep.

P. Sick,[7] of Leipsic, points out that aside from eliminating the danger of having to use large quantities of chloroform, scopolamin-morphin " secures an unlimited field of usefulness to ether which can be reduced to one-third its usual quantity; thus we need

[6] *Edinburgh Med. Journal,* Dec. 1909, n. s. III, pages 548-554.

[7] *German Med. Weekly,* 1910.

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not fear the usual irritating effect of ether upon the lungs.

" The amount of scopolamin may be increased — adapting the dose to individual and case — without danger, but the morphin should be limited to its smallest effective quantity and should only be given with the last injection of scopolamin half an hour before the operation, in quantity of .01 g.

" If the doses are properly proportioned this combined narcosis takes first place among all methods, not only on account of its harmlessness and its scope of action but also on account of the humane manner in which it takes effect.

" When given in proper proportions and combinations, these several chemically different narcotics acting upon different systems of the organism permit narcosis to be obtained with the lowest individual doses and for that reason the least danger is incurred both during and after operation."

Edv. A. Bjorkenheim,[8] of Helsingfors, Finland, finds when using scopolamin-morphin before chloroform in gynecological operations that " the course of narcosis is quiet and undisturbed, the sleep begins calmly and the patient displays no agitation. Dur-

[8] *Zentralblatt*, 1911.

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ing narcosis there is never vomiting and if there is any after operation it is only slight."

Dr. Gauss in the 1911 Address at Carlsruhe,[9] in speaking of the use of scopolamin-morphin in surgery, says: "Since ether was introduced for narcosis by Jackson and Morton in 1864-7, and chloroform by Simpson, the medical body, while conducting a never-ending controversy as to which of these drugs is better, have nevertheless agreed upon one point — that is, that in both methods death and undesirable accessory effects occur which cannot always be avoided.

"This fact was the basis of the endeavor to reduce the danger of general narcosis by preliminary injections of scopolamin and morphin. The specific action of scopolamin-morphin as a narcotic was first recognized and tested by Schneiderlin and Korff in Freiburg in 1900. They started from the idea that a combination of the two alkaloids must be a particularly happy one, as anesthetic and hypnotic effects are common to both, while their remaining properties are almost without exception antagonistic.

"It was consequently to be expected that a summation of the desired narcotic action would be ac-

[9] At conference of German naturalists and doctors.

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companied by a simultaneous diminution of their danger.

"As a matter of fact, recent laboratory researches have made it appear that in scopolamin-morphin we have not, as was formerly believed, two independent substances acting in conjunction, but a new combination that acts in a completely different way from its individual components.

"In addition to the improvement of the narcotic action by this combination, a number of additional advantages are to be observed; these are, reduction of secretion of saliva, diminution of nausea, and the abolition of the subjective unpleasantness which accompanies the initial stages of every inhalation narcosis — terror and suffocation.

"Used as a preparatory action to an inhalation narcosis, surgeons soon found a new application for scopolamin-morphin.

"All authors reporting on these experiments unanimously remark that in addition to the advantages of making a humane narcosis possible, one fact was striking — a reduction in the amount of inhalation narcotic used.

"This reduction in the necessary ether or chloroform must simultaneously cause a reduction in the risk."

It will be interesting to give the results which I

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have gathered from an investigation of statistics for deaths under anesthesia in major operations.

Chloroform 1 in 2060 cases.

Ether 1 in 5930 cases.

Scopolamin 1 in 4762 cases.

The ether statistics should be corrected by statistics for deaths in ether pneumonia, for these statistics only deal with deaths during operations. By adding the ether-pneumonia deaths, the ether death-rate would be greatly increased. This would probably then give scopolamin the lowest death-rate.

I now want to introduce this remarkable scopolamin to you in still another guise — as the savior of patients with the morphin habit.

This report of Fromme's [10] is a particularly interesting contribution to scopolamin's good character, for it goes far to prove the harmlessness of repeated injections, a fact which Gauss has already claimed. Both Gauss and Fromme believe scopolamin to have no degenerating effect upon the organism.

In proving his faith in the safety of a prolonged scopolamin narcosis, Fromme out-does all the obstetricians and surgeons; he actually keeps his patients under the influence of scopolamin for *eight* days!

[10] "Curing the Morphin Habit by Scopolamin," by Arnold Fromme. *Berlin Klin. Wochenschrift*, 1912.

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By this method the morphin habit can be cured without the usual accompanying tortures of abstinence.

He first gives from 2 mg. up to 1½ cg. scopolamin through the mouth, gradually afterward reducing the dose to a minimum. At the same time he gives morphin in combination with stimulants of the nerves and stomach.

While withdrawing the morphin he keeps the patient in a narcotized condition by *injections* of scopolamin given every four or five hours.

The scopolamin then acts in combination with the morphin still stored in the tissues of the patient. When all morphin has eventually been entirely excreted and the symptoms of abstinence have disappeared, then scopolamin is discontinued without any evil effects.

The narcosis is never so deep that the patient neglects to attend to his bodily functions.

In reviewing these accounts of the use of scopolamin in surgery, the strongest impressions left are:

1. The patient is spared agitation and distress beforehand.
2. Painlessness after operation.
3. Avoidance of shock from operation.
4. The "lessened danger" of narcosis.
5. The diminished tendency to vomiting.[11]

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The first three are also characteristics claimed by Gauss for his Dämmerschlaf, and attested to by every mother with whom I have spoken.

The last two points are interesting as being in direct opposition to the accounts of the effect of scopolamin in childbirth given by the opposers of the Gauss method.

Keep in mind this important fact, of which Gauss has reminded us, that the surgical dose is often .0036 g. scopolamin + .03 g. morphin, administered within three hours, and then recall the *small fraction* of this dose spread over a much longer period employed in childbirth — the significance of these surgical reports on the harmlessness and advantages of scopolamin then gain all the greater weight.

" Away with this incalculable, useless and dangerous poison! " exclaims Elek Ararffy [12] of Budapest, when scopolamin is employed in *childbirth.*

" Scopolamin is one of the most humane and valuable drugs," says Eugen Boesch when scopolamin is employed in *surgery.*

Is scopolamin, then, the Dr. Jekyll and Mr. Hyde of medicine?

[11] Weingarten in his Inaugural Dissertation (1904) in reporting on his experiments with scopolamin in childbirth at Geissen declares: " Injections never caused vomiting; on the contrary, they stop vomiting."

[12] *Gynecological Review,* 1909.

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XII

How Does Twilight Sleep Affect the Child?

THE first question every mother asked when the scopolamin-morphin method has been mentioned is: "But is it safe for the baby?"

This has conclusively proven to me that no mother thinks first of her own comfort.

A woman may be a coward where pain is concerned, she may be selfish in daily life, but when it comes to the supreme test of relief of suffering at birth she will accept no method of painlessness if she believes it involves injury to her child.

Dr. Max Salzberger, of Kulm, has endeavored to answer this question by assembling much material gathered from various statistical sources on the subject.

To Dr. Salzberger's paper [1] I shall add the additional evidence of many other physician's opinions on this most important phase of the Dämmerschlaf.

Dr. Salzberger begins by saying, "Now a suf-

[1] "On Danger to Child from Scopolamin-morphin," published in 1910 (Breslau).

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ficiently large number of patients have been observed by obstetricians to prove positively that Twilight Sleep when properly conducted is without danger to the mother, so there only now remains to deal with the statements of antagonists in regard to the injurious effects of scopolamin upon the child. According to these opponents the mortality of children during and after birth is increased. Further injurious effects are claimed to be caused by decrease of the milk secretion of mothers, and still furthermore the unfavorably influenced later development of the child."

Before beginning to prove by practical investigation the harmlessness of scopolamin in relation to the child, Salzberger feels he must first put the question, whether is it theoretically possible to ascertain any influence upon the child by scopolamin administered to the mother?

Holzbach's researches have proven the amount of scopolamin transmitted to the child to be trifling, and these physiological tests have, moreover, proven the drug to be excreted by the child's kidneys within fifteen minutes after birth.

Salzberger lays great stress on the necessity for severely separating asphyxia from oligopnea, as asphyxia must be ascribed to other causes than scopolamin. "This positive division between oli-

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gopnea and apnea on the one hand and asphyxia on the other, is not made by all writers, and thereby comparative statistics of the effect of scopolamin on the child are rendered very difficult.

" This division is urgently necessary, because while the quickly excreted scopolamin may be harmless, asphyxia is always dangerous and threatening to the life of the child.

" Only when the mother has received an overdose of scopolamin can the apneic condition of the child be alarming. In that case even the rapid excretion of scopolamin may not prevent the serious intoxication of the child. The necessity for physicians to adhere faithfully to the Gauss system of dosage is therefore all the greater, and it is especially imperative that they adhere to the memory test, especially as there is as yet no other reliable indication for the guidance of the doctor in calculating the proper doses.

" As an overdosing of the mother can always be avoided by proper care, we need not consider this question.

" If the child is born within two hours of the last injection of mother, it is sometimes born oligopneic; if it is born later it is in most cases lively, even although it has received neither more nor less scopolamin than if it had been born earlier; this proves

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that coincidence and accident creates a large margin of possibilities.

"Only could asphyxia ever be proven to be due to scopolamin where it can also be proven that the injections caused an abnormal lengthening of the birth. For this, statistics would have to be kept of asphyxiated children born both with and without scopolamin injections; only by this method of procedure could it be proven that the number of children born in an asphyxiated condition with scopolamin is superior to those born outside Dämmerschlaf."

The reports of Steinbüchel, Wartapetian, Newell, Weingarten, Hocheisen, and Steffen point out a lengthening of the period of birth, but there are more on the other side who declare scopolamin does not prolong the birth period, some even declaring that the birth process is accelerated, and as Salzberger says the variation in the doses employed by almost all physicians shows a new difficulty in the way of obtaining comparative statistics, for the various symptoms caused by scopolamin present entirely different aspects in different doses.

"Puschnig states that he has never observed any such great intoxication of the child as has been observed by Hocheisen. Bass only found some children tired and sleepy. So we see the great difficulty in arriving at any positive opinion on how far even

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prolongation of birth is responsible for the condition of the child.

" The statistics compiled from scientific literature give us the total percentage of still-born children as 1.3 per cent. Of these still-born infants only one can be ascribed to scopolamin, that is the case described by Hocheisen: ' Fifteen minutes after injection the heart sounds of the child varied and finally stopped.'

" Among 2130 scopolamin cases only 1.1 per cent. died up to the third day after birth. Two of these were ascribed by the writers to scopolamin. One of these children dying suddenly from heart collapse was reported by Bass, the other is mentioned by Gminder as dying from asphyxiation caused by the narcosis, the reflex movements were lacking and death occurred within a few hours. This latter was a very protracted birth and it is difficult for Gminder to prove that scopolamin was even indirectly the cause of death.

" If we assume in these two cases intoxication by scopolamin — which, by the way, is not at all definitely proven — it is seen from this part of our statistics that, even counting these two deaths, scopolamin does not unfavorably influence the per cent. in the total mortality of children.

" In 2081 cases the number of both oligopnea and

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asphyxia is found to be 23.9 per cent. and the data on which these statistics are based is not uniform. The older statements as to the action of scopolamin upon the child deal only with the first groping experiments made under this narcosis — experiments of the most varied and unfavorable character. With the introduction of exact instructions as to the dose by Gauss, the failures in Dämmerschlaf became rarer and the reports subsequently more uniform and therefore more easily to be compared with one another.

"Even in the same hospitals statistics were quickly altered in favor of the method. In one clinic, for example, among the first series of births the per cent. of oligopneic children was 23.5 per cent., in the last series of 120 children only 7 were oligopneic."

The Gauss statistics Salzberger regards as proving conclusively that scopolamin does not affect the milk supply. This is the more remarkable when we remember that scopolamin is closely related to atropin.

Kuenzer's statistics also coincide with those of Gauss. In 223 cases, which Dr. Kuenzer treated with scopolamin, 77.1 per cent. were able to suckle their children; in 121 confined without injections only 66.9 per cent. had milk. Preller and Lehmann

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both testify that there is no disarrangement of the lactation.

"This surprising effect of scopolamin upon the increase of mother's milk," says Salzberger, "may be explained by the fact that the condition of the mother after a Dämmerschlaf birth is so much better; she is able to get up sooner and this alone would exercise a very stimulating effect upon the lactation. That there is a stimulation of the milk secretion by scopolamin has been pointed out by both Kuenzer and Jüsgen. Among Kuenzer's 223 scopolamin patients, 47.5 per cent. got up before the third day. Only Hocheisen and Bass have observed that the children nursed indifferently, showing a disposition to fall asleep before being satisfied, during the first few days. This prolonged toxical effect has never been observed by other writers. Even without scopolamin, mothers often state that their infants are drowsy generally and fall asleep before they finish suckling.

"Other writers cannot conform Hocheisen's suspicion that the drug will have an injurious effect upon the child's later mental and bodily development. Gminder found no evidence of disturbance during the ten days the children remained at the hospital. Puschnig also declares there is no effect on the first stages of development.

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"Among 500 scopolamin children born between 1905 and 1907 I have made inquiries among the mothers and received 318 answers which show that only seven children (1.4 per cent.) died during the first nine days. Of these 318 children 285 (89.7 per cent.) were still living after one year. One hundred and two had not yet reached a year's age and of those ninety-two were still alive. These figures prove that scopolamin administered to the mother has no injurious effect on the health of the child during the first year."

Salzberger even investigated the respective doses given the mothers in those cases where the children died within the first year and found the injections averaged .00126 g. scopolamin. The mothers of children still living after one year had received *more* scopolamin — at an average .00131 g. Therefore scopolamin cannot be accused. Furthermore, there were no symptoms shown by the children who died which could point to toxic effect of the drugs.

"A résumé of these observations and statistics give the result that scopolamin when properly administered harbors no danger to the health and development of the child."

Salzberger's very fair and judicial paper only proves to my mind that as yet nothing has been

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positively proven one way or the other on this subject, although the preponderance of evidence is in favor of scopolamin.

Final proof must be lacking until statistics are very differently compiled.

First: separate statistics of asphyxia on the one hand, and oligopnea on the other, must be provided. Second: statistics should be kept of the results of various physicians employing the same dose, as it has been shown that dosage has everything to do with the effect on the mother as well as on the child.

Until such uniform data are forthcoming we have only the personal opinions of doctors based on their individual experiments variously conducted, on which to depend.

As, however, the consensus of personal opinion, even under such varying technic, is to the credit of scopolamin and even the unsatisfactory statistics agree with these opinions, it would certainly seem safe to say that as yet it is entirely *unproved* that scopolamin is injurious to the child.

Here are the opinions of many doctors.

Bruno Bosse of Berlin:

"This method does not cause mental stunting of the children."

J. Fonyo of Budapest:

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"For the child scopolamin is not dangerous if correct technic is observed."

Josué A. Beruti of Buenos Aires:

"There is no injury to the child's organism from scopolamin."

J. R. Freeland (University of Pennsylvania, L. M.) and Bethel A. H. Solomons, M.B. (University of Dublin, L. M.) in a joint paper conclude:

"No ill effects to mother or child need be expected to follow the rational administration of scopolamin."

Dietschy of Bâle:

"Children take the breast after scopolamin like any others."

Mayer of Marburg:

"No subsequent effect upon the child was observed."

F. N. Iljin of Petrograd:

"All mothers and children left the clinic absolutely sound."

Preller of Mannheim:

"If children are left alone they will sleep off intoxication. No lasting injuries to children were observed and they develop well."

Pisarewsky (*Polish Monthly Journal for Gynecology and Obstetrics,* 1905):

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"Children are born fresh and lively."

Von Herff of Bâle:

"Children never exhibited serious symptoms after scopolamin."

Cremer (*Medical Quarterly Review*, 1908):

"Children are never asphyxiated by scopolamin."

W. A. Brodski of Moscow:

"If correctly administered scopolamin is entirely harmless to mother and child."

R. C. Buist of Dundee:

"The description of the attitude and behavior of the infant with its readiness to sleep and superficial respiration does not suggest any marked departure from the normal."

Kleinertz of Stüttgart:

"Most of the children were vigorous and hearty. No child died as a consequence of the injections. Neither was any deleterious effect on the later development of children observed."

Frigyesi of Budapest:

"The injections never caused the death of a single child. Accurate investigations were made on the reduction of milk, the amount of food taken by the children, and their weight. These investigations brought to light nothing to the disadvantage of the method."

At a meeting of the British Medical Association

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held at Sheffield in 1908, Dr. Bernhardt Krönig [2] explained the strikingly small mortality of children both before and after birth in Twilight Sleep as being due to the fact "that the moderate inactivity which is produced in the respiratory center during birth, by very small quantities of scopolamin, is of advantage to the child; the child is made a bit drowsy and this drowsiness prevents it from premature intra-uterine" (before birth) "respiration. The air passages remain free and in cases of slight asphyxia, for example, prompter and more certain revival is to be expected."

[2] *British Med. Journal*, 1908, Vol. II.

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XIII

Reports from Hungary, The Argentine, Russia, England, and Germany

THE day of violent opposition to Twilight Sleep on the Continent seems to have ended abruptly.

In the reports of 1909, '10 and '11 one searches in vain for a repetition of the picturesque fury of Bumm and Hocheisen or the failure of Steffen.

The reports are, nevertheless, full of interest — greater interest, in fact, for they continually add more convincing evidence that even with the greatest variation in its manner of application the Dämmerschlaf can positively guarantee to women a sure and safe respite from the agony of childbirth.

"Never before have I seen so many grateful and smiling faces in the lying-in wards as from and after the first day of the introduction of Twilight Sleep. Even the mere explanation of the action of the Dämmerschlaf has a most cheering effect upon the mothers-to-be."

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With these words Frigyesi [1] of the Second Budapest Woman's Hospital opens his report on 200 cases conducted with close observance of the Gauss rules.

In 80.7 per cent. of his cases complete amnesia was attained. In 25 per cent. there was reduction of pain without amnesia.

"On the whole, no prolongation of the total time of birth was noticeable, in spite of the fact that in 11 per cent. of cases labor became weaker. In only four cases was the straining action inhibited.

"Operative frequency was 5½ per cent. and even when taking the severest view of it, only 4 per cent. of these could be attributed to scopolamin.

"The postnatal period was unaffected.

"Fifteen per cent. of the children were oligopneic; none of them died. Two per cent. of them were born with asphyxia, but with these cases scopolamin certainly had nothing to do.

"Acceleration of pulse never occurred to such a degree that Dämmerschlaf had to be broken off.

"I warn against the employment of scopolamin-morphin in private practise without sufficient experience.

"If the right dose is given there is no injurious

[1] Gynecological Society of Dresden, May, 1909, and *Gesellsch. d. Aerzte,* 1908, Budapest, 1909, pages 19-22.

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effect on either mother or child, and for this reason I believe the Dämmerschlaf to be the most valuable of all methods."

High words of praise these, certainly.

From the far Argentine comes a report on 600 scopolamin births conducted by Dr. Josué A. Beruti [2] of Buenos Aires.

Dr. Beruti attained perfect success in 65 per cent. of his cases, partial success in 21.83 per cent., and no effect in 12.16 per cent.

"I observed no danger or injury to the mother or essential influence upon the process of birth. I furthermore declare there is no injury to the child's organism by scopolamin."

At the Eleventh Pirogow Congress of Doctors held at St. Petersburg (Petrograd) in 1910, several Russian physicians reported on their experiences with Twilight Sleep.[3]

F. N. Iljin of the Imperial Obstetrical and Gynecological Institute had observed 67 cases of scopolamin-morphin births.

[2] *The Medical Klinic*, 1909.

[3] From *Central Journal for Gynecology*, Leipsic, 1910, and the Report from the Obstetrical and Gynecological Section of the Eleventh Russian Congress of Doctors.

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Dr. Iljin carefully carried out the Gauss memory test and according to the results of this, gaged his third injection of scopolamin.

"My first injection in case of a first child is given when the os is distended to about three fingers in width. In other cases the injection is given when the opening of os is two fingers and labor well established."

Dr. Iljin's doses are stated to be as follows: First injection, .0003 g. scopolamin and .01 g. morphin, injected separately. After one hour, .00015 g. or .0003 g. scopolamin is used without morphin. In thirty-eight instances he injected a total of .00165 g. scopolamin.

In 60 per cent. complete amnesia was attained. "Many mothers knew nothing whatever of the birth process."

In forty cases he observed a weakening of the labor. One case of delirium and four cases of hallucinations. Vomiting in three cases and thirst in all cases.

No irregularity or acceleration of the pulse was observed.

In one case twins were born by aid of the forceps. Only one case of asphyxiated child.

He reports the afterbirth period and childbed to be normal.

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"All mothers and children on leaving the clinic were absolutely sound.

"The use of this method necessitates experience, as the narcosis must be *individualized* to a great extent.

"On the base of my observations," says Dr. Iljin, "I have come to favorable conclusions:

"Scopolamin-morphin renders birth painless."

Dr. W. A. Brodski of Moscow conducted 200 cases, among which were 28 women of narrow pelvis.

"The narcosis had no influence upon the duration of birth; the strength and frequence of pains were unaltered.

"The duration of afterbirth period averaged only twenty-five minutes.

"Only once a slight hemorrhage occurred."

In a few cases acceleration of pulse was observed. Red face and hallucinations in 15 per cent. of cases.

"There were nine cases of forceps, four of these being due to narrow pelvis and two to eclampsia."

The children were all born alive. Six cases of asphyxia, "two because of entanglement of cord around the neck."

He concludes: "If correctly administered sco-

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polamin-morphin is entirely harmless to mother and child."

Dr. Trabscha observed in her forty cases that the children were very quiet after birth and cried but little and then weakly, until the scopolamin was excreted through the kidneys. This result was probably due to her dose of morphin which was .05 g.

Dr. Abraszanow of Poltawa after 100 cases arrives at the decision that the narcosis is uncertain, but his deductions are not injurious to the cause, for he describes this uncertainty as follows:

"Part of the patients slept throughout" (which would indicate too deep a narcosis). "Some do not sleep but realize no pain" (indicating a proper Dämmerschlaf). "Others feel pain but not strongly"—all of which indicates an uncertain technic on the part of Dr. Abraszanow more than an uncertainty in the effect of the drugs themselves.

"The pupils are enlarged, the pulse accelerated, and sometimes there is vomiting."

Dr. Abraszanow says in the end:

"My general impression of this narcosis is favorable."

Dr. P. L. Guiseppi, M.D., F.R.C.S., Late Senior

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Medical Officer, Queen Charlotte's Lying-in Hospital, reports on thirty-seven cases,[4] twenty-six of which were primiparæ (that is, bearing children for the first time) and eleven were multiparæ (mothers who had already borne other children).

Dr. Guiseppi finds that most of his patients fall asleep after the labor is completed; in many cases the patients forget altogether the little pain they have suffered and when they awaken deny they have felt any pain whatever.

In regard to the after effect on the child he says:

"The child is said to be drowsy some hours after, but as most children sleep after birth it is rather difficult to know how much truth there is in this assertion."

As an indication that scopolamin has no influence upon the child's development during its first weeks of life, Dr. Guiseppi says:

"As far as this investigation has gone, there has been no effect on the curve of the gain in weight."

Of afterbirth hemorrhages and atony (or want of tone and relaxation) in the uterus, he remarks that, "it is very doubtful if there are any such risks."

Writing of the effect on the labor, Guiseppi quotes Spencer Shell, who thinks labor is unaffected,

[4] *The Practitioner* (II), July, 1911.

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and Newell (who is an American), who declares labor to be shortened definitely, while Ziffer's statistics are as follows: labor pains normal in 7 cases, increased in 18, excessive in 6, and not diminished in any case.

Dr. Guiseppi's conclusions in regard to Twilight Sleep are as follows:

"1. That the object of hyoscin (scopolamin)-morphin anesthesia is not to produce complete unconsciousness but to produce Twilight Sleep, from which the patient can be roused at any moment without her retaining any recollection of what has happened in the meantime.

"2. That in hyoscin-morphin anesthesia we have efficient means of controlling pain and one that is practically safe when ordinary precautions are taken.

"3. That there is danger to the child unless the fetal heart" (the heart of the yet unborn child) "is carefully auscultated" (listened for) "at frequent intervals.

"4. That the course of labor is but slightly modified.

"5. That the administration and repetition of the injections must be gaged by the amount of suffering. (Dr. Guiseppi evidently omits the memory test.)

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"6. That the morphin should never be repeated, but only the hyoscin.

"7. That the solutions for injections must be freshly prepared for each patient.

"8. That the best dose is $\frac{1}{100}$ of a grain of hyoscin hydrobromic + $\frac{1}{4}$ of a grain of morphin sulphate."

Dr. Guiseppi regards Twilight Sleep as a reliable method to give relief in labor, and says the amnesia attained through it makes it of especial advantage to exhausted and very sensitive patients.

Bruno Bosse[5] of the Berliner Klinic and Wladimir Eliasberg, in reporting on 250 cases, say: "Doctors must not be discouraged at first and should make the necessary preliminary studies. If in some cases there are eventual failures it is either due to the personal idiosyncrasy of patients to the drug or there has been too long a delay on the part of the physician in giving the first injection."

Dr. Bosse employs the Dämmerschlaf with equal success both in surgical operations and confinements.

"Only absolute weakness of labor is considered a counter indication. High fever and hemorrhage would not deter us from use of scopolamin."

[5] From Collection of Clinical Lectures on Gynecology, 1910, and Report at Berlin Med. Soc., 1911.

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Dr. Bosse is the only physician to sound the following warning and it may be well worth heeding:

"A patient should not be treated with scopolamin-morphin on an empty stomach."

After reading in these reports, "Memory test superfluous," we are not surprised to find that "Deep sleep was attained in 30 per cent."

If the Dämmerschlaf achieved by Drs. Bosse and Eliasberg was of so deep a nature it is all the more impressive to find them stating:

"Abdominal action was not influenced unfavorably, there was no psychalgia (mental suffering), no eclampsia; the average length of birth was not greater, and dangerous side effects were not observed. Labor remains good as the motor functions are not affected."

Bosse adds a personal statement to the effect: "I have never observed protraction of birth through use of this drug, although in cases of naturally protracted births I have had to employ many injections; these have, however, never resulted in threatening symptoms."

Drs. Bosse and Eliasberg give a first injection of 3 cmg. scopolamin + 1 cg. morphin when pains are well established. Second injection after fifty minutes. Third, half injection, is given at from two and a half to three hours after the second.

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"In protracted births ½ grain scopolamin is given every three, four, or five hours. With practise it will be seen that often smaller doses will be sufficient."

In these 250 cases, operative interference was necessary in 11.4 per cent.

There was only one case of hallucinations and one case of complete unconsciousness with catatonic rigidity of one arm.

"Of subjective side effects," says Bosse, "I have observed only thirst to exist.

"Afterbirth hemorrhage was not more frequent than is usual."

Ninety-seven per cent. of the children were born alive. Of these nineteen were slightly oligopneic. Eight children were born asphyxiated, but "efforts at restoring life were in all cases successful."

Both these physicians agree that "scopolamin does not cause mental stunting of the child," and Dr. Bosse ends by saying:

"I conscientiously recommend the use of the Dämmerschlaf in obstetrical practise."

One of the most exhaustive papers written on the Dämmerschlaf is that of Wilhelm Tichauer.[6]

[6] "Scopolamin-morphin in Obstetric Practise." Inaugural-Dissertation (Breslau), 1911.

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Tichauer reviews, with comments, all the obstetrical reports obtainable on the subject; as all those reports are given in this book it is not worth while to quote this part of his dissertation; I shall only give his résumé.

"We must clearly distinguish between the two methods.

"One, that introduced by von Steinbüchel, endeavors to attain reduction or total abolition of suffering. As adherents of this method, we must consider all those who simply continue the injections until pain is either reduced or done away with. In doing so we must, to be sure, admit that many of them far exceed the dose administered by von Steinbüchel.

"The other method, which aims at alleviation of pain and amnesia, is the Twilight Sleep procedure described by Gauss, the principal characteristic of which is the testing of the powers of apperception.

"The records show that both methods attain their object. Only few persons are entirely unaffected by the injection. A large proportion of the negative results are due to the fact that the birth took place before the scopolamin-morphin had time to exert its action.

"The object is attained in the great majority of cases — so much is admitted even by opponents —

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and is consequently beyond question. The only further question is what price is paid for it.

"Flushed face, headache, intense perspiration, are symptoms that need hardly be taken into account in comparison with the great alleviation of the suffering. Nausea also occurs at confinements when scopolamin is not used. Surgeons, who on other points are so frequently quoted by opponents of the method, state categorically that scopolamin-morphin does not cause the usual annoying sickness after narcosis.

"Maria Garca and Salvatore Diez of the Turin Lying-in Hospital even use the drug for hyperemesis" (extreme vomiting) "and that with invariable success.

"Restlessness, delirium with hallucinations, and twitchings (even on the assumption that these symptoms are really concomitant effects of scopolamin), look much worse than they are. This is the universal opinion, and is shared even by opponents, and, in addition, such symptoms occur relatively seldom. To the patient *they do not matter in the least.*

"Only a few observers attribute to the drug an action on the heart and breathing, or the afterbirth period, the lactation, or the subsequent development of the child. Most of those who have used it deny

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the existence of such an action, provided that correct dosage is conscientiously adhered to. The same is the case with regard to atonic hemorrhage. The investigations have not proved any action of that kind.

"The case of intoxication of the mother observed by Gminder can be laid to the charge of his procedure. Whether the case of the death of the mother reported by von Bardeleben should be ascribed to scopolamin is, in view of all the circumstances, extremely questionable.

"According to most of the authors, the oligopnea and asphyxia of the children give no grounds for anxiety.

"If, in the tables, the figures for the reduction of the birth pains and straining action occasionally appear somewhat high, this is due partly to the procedure employed, partly to the very severe standards of individual authors, and partly also to accompanying circumstances. Under the headings, 'deterioration of the pains,' and 'deterioration of the straining action,' some authors include also those cases which show only very slight effect. Only so can we explain the fact that in spite of high figures in these reports the duration of birth is given as normal or only slightly prolonged. From the results given we are certainly entitled to say that at

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the worst the birth is only retarded to an inappreciable extent.

"Of the six cases in which scopolamin is said to have caused the death of a child, three are stated to have been the indirect result of scopolamin. That scopolamin was really responsible for the deaths has not been proved beyond contention in any one of the cases. As we have seen from the accounts another explanation can very well be given.

"Even if in 3,929 births, scopolamin is accused of being guilty of the death of only one mother and six children (and these cases are open to doubt), scopolamin cannot be proven to be such a terrible poison after all.

"It must not be forgotten that in the use of new methods there are always failures at first, and in this case experimenters kept beginning again without reference to the experience already acquired, for the various obstetricians did not adhere to the rules which had been arrived at as the result of experience.

"A comparison of the two methods shows at once that Twilight Sleep carried out in accordance with the rules laid down gives considerably better results than von Steinbüchel's method; while the latter method was not in itself injurious, the often extremely arbitrary variations of it which have been

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employed seem, in fact, really to have led to very injurious results.

"The Dämmerschlaf method has not caused the death of a single child, and not one death of a mother has occurred which can be positively attributed to it.

"If some workers believe on theoretical grounds that they can dispense with the testing of apperception, a comparison of the tables will, for most people, be a proof of the contrary.

"It is clearly shown by them that scopolamin-morphin as used in the form of Dämmerschlaf, with precise observance of the rules laid down, is capable of attaining reduction of pain and amnesia without endangering either mother or child.

"One point, to be sure, must be again and again insisted upon. The medical man must be thoroughly familiar with the method and must be able to observe the patient continuously, not so much on account of the great danger of scopolamin, as because otherwise the desired effects will not be obtained.

"The continuous observation is a demand that the general practitioner can hardly fulfil, and the introduction of Twilight Sleep into general practise will probably split upon this rock.

"There is the further difficulty in institutions

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with too large a number of patients. The presence of numerous patients in labor in one ward, and the fact that beyond this doctors and nurses are very much occupied, are extremely unfavorable circumstances for the carrying out of the Dämmerschlaf."

August Johnen[7] of Mankarthof, in a very able paper covering the entire ground and history of the use of every narcotic and hypnotism in childbirth, sums up at the end by saying:

"At any rate the scopolamin-morphin narcosis is the one which is to-day the best with regard to the lessening of suffering at birth, and it surpasses the semi-narcosis of chloroform and ether, on account of its easier and more convenient application as well as because of its less dangerous character."

[7] "The History of Narcosis at Spontaneous Birth," Inaugural Dissertation (Erfurt), 1911.

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XIV

Gauss's Latest Address on Twilight Sleep

IN Carlsruhe in 1911 at the Conference of German Naturalists and Doctors, Gauss made his last public address[1] on the Dämmerschlaf, before turning his attention from what he considered a "perfect method of childbirth" to experiments with radium in cancer.

"Since von Steinbüchel's first attempts in 1903 to make scopolamin-morphin of use in obstetrics, between 8,000 and 10,000 births have been observed in which this combination has been employed. Three thousand of these births have occurred at the Freiburg Frauenklinik.

"In the six years of the Dämmerschlaf in our clinic no material change has been made in the technic, so these 3,000 births furnish homogeneous statistical material as a touchstone on which to test other groups.

"On the basis of our six years' experience, it can

[1] "Further Experiments in Dämmerschlaf," by Carl J. Gauss. Hitherto unpublished.

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be maintained that Twilight Sleep is to be looked upon as devoid of danger, and a great blessing.

"Danger to the mother never occurs if deep narcosis is avoided. The avoidance of unpleasant accessory effects and the obtaining of a proper and safe Dämmerschlaf is entirely dependent on the strict observance of the rules given for our method. If an experimenter conscientiously follows these rules, success can be guaranteed in the majority of the cases; that is, up to 82 per cent.

"The deaths for which the method has been held responsible cannot be proven to be due to scopolamin-morphin. Under our method the mortality of mothers has shown no increase.

"There is likewise no danger to the child if Freiburg directions are carried out.

"The occasionally observed oligopnea of the newborn is a symptom which every child brought to birth with the forceps also exhibits, without anybody attaching any importance to it.

"Cases of asphyxia do not occur more frequently than in ordinary practise.

"Retardation of the birth and increase in the frequency of operation need only occur if by a wrong technic an actual narcosis is produced.

"The results of the various experiments of obstetricians with the method give extremely contra-

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dictory results; on the one hand warm advocacy, on the other brusk rejection. Closer examination gives a very simple explanation of these contradictions, for different methods, with technic differing in principle, must naturally lead to quite different results.

"Steinbüchel's, Hocheisen's, and our Dämmerschlaf are three distinctly different methods."

It may be well to explain here that von Steinbüchel only endeavored to attain a reduction of pain without amnesia. His doses were consequently very small. The patients received from one to two injections of .0003 g. scopolamin +.01 g. morphin. In his first set of twenty cases he only failed to attain the desired reduction of pain in one case. In his second series of eleven births, all took place without a single failure or unfavorable incident.

Hocheisen's experiments, with which we are familiar, were conducted without the memory test, the injections being administered entirely according to the complaints of the women about their suffering — a procedure which all literature on the subject has proven utterly unreliable.

Gauss's method, unlike either of the foregoing, aimed at amnesia, or forgetfulness of the birth, and his method was on a decidedly psychological basis,

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the dosage being regulated entirely by careful tests of the capacity of the patient for storing impressions after the drugs began to take effect.

We will now resume the quotations from Gauss:

"After the pros and cons in theory and practise have waged an indecisive struggle all these years, do not expect me on this occasion to describe the advantages of Twilight Sleep — our patients can describe them much better than we.

"I only desire to prove here that it is the Dämmerschlaf itself which has refuted the bad reputation given it in some quarters.

"I will begin with the most important point in the hostile criticism, viz.: the alleged dangers to the mother.

"It seems to make the obstetrician's hair stand on end to find that childbearing patients in Twilight Sleep have a respiration reduced by as much as four breaths a minute.

"By a confusion of Dämmerschlaf with gynecological surgical narcosis (in which surgeons do not hesitate to employ as much as .0036 g. in three hours), it is then reported that the pulse increases in Dämmerschlaf to 150 beats with a temperature rising to as much as 39°.

"Obstetrical literature only records one death laid to the charge of scopolamin — that recorded by

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Bardeleben. This is the case in which he says he administered .0003 g. It was a spontaneous birth, many hemorrhages, and postmortem proved anemia and heart trouble.

"In accordance with the majority of authors who regard scopolamin as devoid of danger to the mother, in all our cases, the injections could not be regarded as the cause of a single mother's death.

"Our maternal mortality in 3,000 cases is ten deaths, among which there was one with placenta prævia, one with colporrhexis with funnel-shaped pelvis; eight patients died of puerperal fever" (fever following labor, due to contagion).

"The point, second in importance, the danger to the child, occupies a much larger space in the literature on this subject.

"Twilight Sleep is said to be responsible, by direct poisoning, for seven dead children.

"If we investigate these cases we find among them: one diaphragmal hernia" (rupture of the muscle separating chest from abdomen) "(Gminder), one necrosis of the roof of the skull" (dead bone) "due to pressure (Avarffy), one case of lues (Hocheisen), one double pneumonia (Avarffy), and one thymus death" (the thymus gland is at the root of the neck) "(Mayer). The cause of death was, in each of these cases, ascertained by post-

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mortem. Of the seven, therefore, there only remains two, one of which died after application of the forceps (Hocheisen), whilst the other died with symptoms suspiciously like those of morphin poisoning (Bass).

"Our own statistics show a child mortality of 1.3 per cent., not including premature births, monstrous births, or children already dead. We have never lost a single child with symptoms of scopolamin-morphin intoxication.

"With regard to the children, moreover, one must not forget that a certain death rate will always remain unavoidable, and that those cases, which hitherto (without scopolamin) did not permit of the assignment of a definite cause of death, must not now all of a sudden be attributed to Twilight Sleep.

"This is all the less justifiable, as Aschoff's theory actually goes to show a reduction by use of scopolamin-morphin of the chances of the child breathing in the amniotic liquid. The following facts support this theory: the statistics of 1.3 per cent. mortality against 3.4 per cent. from 1895 to 1904.

"Among our children who were born alive, 80 per cent. were brisk and lively, 16 per cent. oligopneic, and 5 per cent. asphyxiated.

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"I must again insist that oligopnea may be regarded as entirely devoid of danger if the condition is not caused by too large quantities of morphin; the infant organism is extremely susceptible to morphin.

"Holzbach's investigations have taught us that the child comes drunk into the world only when the scopolamin is injected shortly before birth into the mother and therefore still remains in the child's circulation. On the other hand, when the scopolamin has been dealt with, having been thrown off by the circulation into the child's urine, the child is subsequently born bright and lively.

"What about asphyxia? It positively *never* occurs as the direct result of scopolamin.

"The frequency of asphyxia where no scopolamin is used is 5 per cent.

"Salzberger's enquiries make it appear that in 421 scopolamin children there were only 11.6 per cent. deaths in the first year, while the general mortality of the children of Baden for this same year was 16 per cent.

"Alienists reported that they found that 4 per cent. of the children born with asphyxia became idiotic, while one-sixth of them learn to walk late and one-ninth of them to speak late. Henner tested these results on 450 children of the Breslau out-

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patient department. He found that difficult birth with asphyxia of the child did not dispose to abnormal mental development or idiocy any more than normal birth.

"It is interesting to remember here that, according to Möbius, through the fault of the midwife, Goethe was born asphyxiated.

"Overdosing of the mother may cause injurious effects in the matter of birth pains, straining action, and postnatal hemorrhage. It is beyond all doubt that these deleterious effects may occur if too large doses are given.

"Since an influence on the motor force of the uterus would make itself most clearly apparent in an increase in the necessity for use of the forceps or placental operations, I will bestow some attention on this point. Antagonistic literature states that the frequency with which the forceps are used in Dämmerschlaf amounts to 20 per cent. and could easily be raised to 100 per cent.

"The frequency of forceps cases in the Freiburg Frauenklinik has settled down to an average of 6 to 7 per cent. As the subjects for all forceps applications made for demonstration are deliberately sent into Dämmerschlaf for this particular purpose, this is a figure that need not fear the light of day.

"The frequency of manual placenta detachment

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ranges between 2 per cent. and 6 per cent. and has an average of 4 per cent. This is a smaller figure than is to be found in most statistics.

"We come now to the principal factor of Twilight Sleep, the anesthetizing and narcotizing action of scopolamin-morphin.

"I should like first to direct your attention to the fact that the expression 'failure' used in the obstetrical reports is as a matter of fact not at all appropriate.

"Even with the second method, which is essentially not the Dämmerschlaf, a reduction of the suffering during birth, is, as a matter of fact, *accomplished in every case.*

"Dämmerschlaf is successful when there is an adequate abolition of the apperception of pain.

"This condition is a kind of subconsciousness in which the cortex of the cerebrum" (outer layer of the big brain) "is, according to Finck, completely cut off from the reflex columns of the spinal cord.

"Strassny waves aside the explanation of this peculiar and hitherto unknown state of consciousness with the unmannerly remark that it is a doctoring of facts to speak of 'painless birth,' and is inconsistent with the dignity of scientific investigation.

"Whatever Strassny may say, our patients re-

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gard their births as 'painless' and Twilight Sleep seems to us a condition well worth the trouble to attain, and to our patients a blessing to experience.

"In our first-class ward we attain perfect Dämmerschlaf in 82 per cent., in the second 66 per cent., in the third 59 per cent., and in the fourth 56 per cent. In 13-15 per cent. there is no effect. This absence of effect may be caused by too-long-deferred injection or personal refractoriness to anesthesia on the part of the patient.

"Why does such a vast difference exist between the results of the Freiburg clinic and those of other authorities? It does not lie in any lack of sober-minded observation, as Herr Bumm thought fit to say five years ago.

"A considerable factor in the explanation is supplied by the prejudice with which various obstetricians, on their own admission, enter upon their investigations.

"Steffen, for example (of the Dresden clinic), says in his paper that he 'knows of no more pleasing sight than that of a strongly built woman giving birth to a first child with strong and painful birth pangs.'"

Because of this acknowledged sentiment, one

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writer has even gone so far as to accuse Steffen of being a sadist.

"Avarffy acknowledged openly that he had recourse to Twilight Sleep only under compulsion.

"Hocheisen regretted that he was compelled by the demand of the public to employ a poison that is so terrible and unreliable. With what seems a certain malicious pleasure he records all the injurious effects in a series of 100 births in which there were *134* interferences with the normal course of labor.

"The best method in the world would break down when such a point of view as this is used as the basis for conducting an investigation as to its value.

"This is especially true of Twilight Sleep which more than any other method requires to be employed with absolute sympathy and an open-minded desire to make the most of it.

"It is not to be wondered at that the reports of Hocheisen, Avarffy, and Steffen do not precisely constitute a hymn of praise to the Dämmerschlaf.

"External circumstances rank only second in importance as obstacles to success. The lack of sufficient obstetrical staff is the first obstacle. Mansfeld is correct when he says we can form no idea of what enormous care, trouble, and continu-

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ous watching a well-conducted Dämmerschlaf demands.

"Fehling draws attention to the fact that not every young doctor displays capacity for carrying out the method.

"I have also learned from private sources that in several clinics the passive resistance of the midwives has forced the physicians to relinquish the method.

"The final cause of failure is that unfortunately in many hospitals the correct technic has not been employed. It may also be assumed that the assistants in these clinics, who are merely gaining experience in the delivery room, are not given careful instructions about Twilight Sleep, especially the memory test.

"As early as 1907 I wrote an emphatic warning, viz.: 'The special action and safety of the Dämmerschlaf are based solely upon the testing of the powers of memory and by this alone our method must stand or fall.' With regard to this passage Mansfeld has said: 'It is really extraordinary that words written in such perfectly clear German can be so misinterpreted.'

"Without paying any attention to this clause which is the foundation of my method, Hocheisen,

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Messer, and others have come forward as opponents of the Dämmerschlaf.

"Twilight Sleep is a narcotic condition of extremely limited breadth — like unto a mountain crest. To the left of it lie the dangers of too deep action, with narcosis and weakness of birth pangs; to the right the dangers of too shallow action with the retention of consciousness and sensibility to pain.

"When the testing of the power of memory keeps the Dämmerschlaf within the confines of the mountain crest, then we find Twilight Sleep not only devoid of danger but the great boon to women it is proved to be by the gratitude of our patients."

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XV

How the Variability of Scopolamin was Overcome

BECAUSE of the complaints made about the unreliability of scopolamin, Prof. Walther Straub,[1] of the Pharmacological Institute of the Freiburg University, began experiments in 1907 to discover the cause of this variability.

These complaints came generally from physicians who used scopolamin to produce Twilight Sleep; exact dosage is here of great importance, as the obstetricians have to work with the smallest effective quantity —.0003 g.–.00045 g. scopolamin.

Very rarely were any complaints made by surgeons who employed scopolamin for total narcosis, where four times the amount used in Twilight Sleep is generally employed. In the surgical dose the effect of decomposition would naturally be much less noticeable than in the small, exact injections required for childbirth.

[1] "About Decomposition and Conservation of Scopolamin-solutions, by Walther Straub. *Münch. Med. Woch.*, 1913.

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Professor Straub did not accept the current opinion that the poisonous products resulting from the decomposition of this alkaloid originated in the scopolamin solution itself. He believed that decomposition was caused by a process of saponification.[2]

"If my supposition was correct, it should be possible to stop this saponification by the addition of conserving substances. As scopolamin is applied hypodermically, prevention of irritation of the tissues must be assured; this caused a limited choice of substances which could be employed for the conservation.

"While testing various substances I found at last the very easily soluble alcohol mannite of six fold value" (sexatonic alcohol mannite) "to be entirely suitable for the purpose. Solutions of scopolamin preserved with from 5 to 20 per cent. mannite were proved to be reliable."

Straub's first investigations in 1907 were for some reason not resumed until 1912. He had then in his possession some stored solutions of scopolamin treated by mannite which were five years old; these were given to the Freiburg Frauenklinik for testing experiments. "They were used for Twi-

[2] A conversion of fat or oil into a soapy substance by the action of an alkali.

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light Sleep and proved to be as effective as freshly made solutions."

Straub felt that the ever-increasing use of scopolamin-morphin in semi-narcosis required that he lay a theoretically secure foundation for his claims for the preserved scopolamin; with this object in view he not only made biological tests but he stored for one year scopolamin solutions with and without addition of mannite in open and sealed vessels, in the dark and in the light.

After one year it was found that the resistance of scopolamin, treated by mannite, to the light was considerable. When kept in open vessels in the full light, solutions preserved by mannite even though *totally moldy* were found to be more effective than seven months' old sealed solutions not preserved.

In the case of scopolamin boiled in a water bath, an addition of 10 per cent. mannite proved to have a conserving effect.

For the biological experiments he used the heart of a frog. These experiments were rendered very difficult as the structure of the frog's heart prevents uniform distribution of a poison. The poison employed by Straub was muscarin — not to be bought in the open market — and he eventually found it necessary to isolate the auricle of the frog's heart

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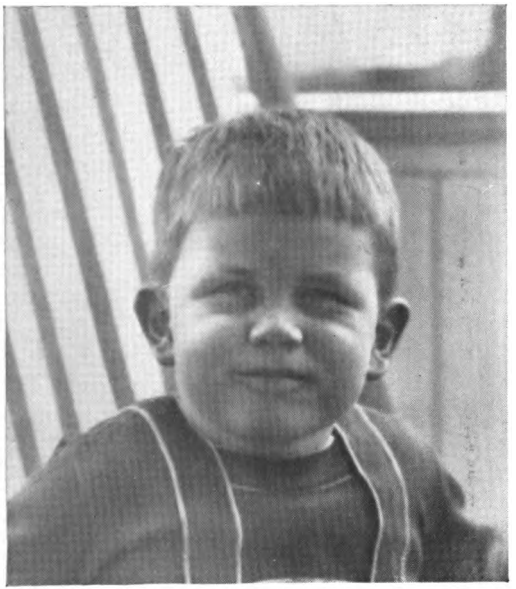
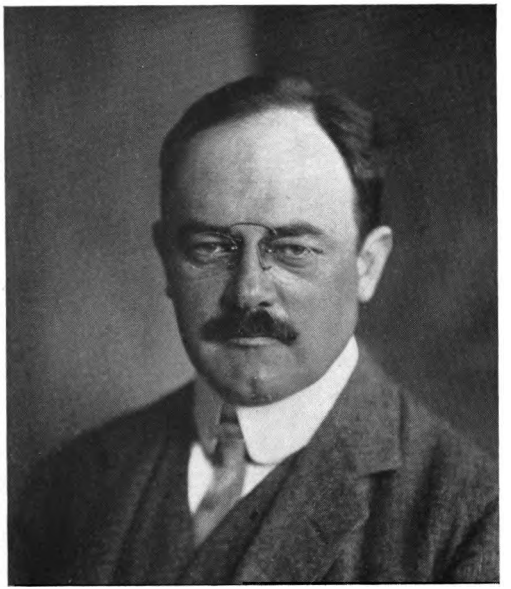


Prof Straub's Twilight-Sleep son



Prof. Walther Straub, the man who overcame the variability of Scopolamin

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for operation; the auricle being composed of a few thin layers of cells was found to be particularly sensitive to muscarin.

After the action of the auricle had been arrested by the use of poisonous muscarin, scopolamin was employed both in freshly made solutions and in preserved state with the following results:

The lowest concentration of a freshly made scopolamin solution which produced an effect upon the auricle of a frog's heart, first treated with muscarin, was $\frac{1}{80}$ million.

The contractions of the auricle, resulting from this application, regained one-eighth of their normal action.

The same result was produced by .02 per cent. scopolamin solution which had been stored for seven months, but it was necessary to concentrate the stored scopolamin to eight times the strength of the freshly made solution.

Straub considers that this proves, not that the preserved scopolamin has only one-eighth the original strength, but it shows that stored solutions lose in strength considerably, even though remaining perfectly preserved.

Professor Straub then had the firm of Hoffman La Roche make solutions preserved by mannite in vials of .0003 g. scopolamin per cubic centimeter

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and these are the solutions now used by the Freiburg Frauenklinik.

Wondering whether the war would make it now impossible for the physicians of Britain and America to procure the "Scopolamin Haltbar" (preserved scopolamin) of Professor Straub, I went to London to see the leading wholesale chemists, and I was delighted to discover that the factory of Hoffman La Roche is situated in Switzerland and so far the war has in no way affected the shipping of Swiss chemicals to England.

I was also assured by Parke, Davis & Co. that even should the war eventually shut off all chemical trade with the Continent, their present supply of scopolamin hydrobromic was sufficient to meet all demands; moreover, I find that the British chemists are as a rule making their own scopolamin, independent of Continental supply.

DR. SIEGEL'S EXPERIMENTS WITH STRAUB'S PRESERVED SCOPOLAMIN [3]

Dr. P. W. Siegel, assistant at Krönig's Frauenklinik, was provided by Professor Straub with some vials of mannite-scopolamin solution which had been stored for from thirteen to fifteen months.

As there was but a limited quantity of these solu-

[3] *Munich Medical Weekly*, 1913, No. 41.

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tions, Dr. Siegel was only able to make a first experiment in 22 cases, but as these experiments were not made to prove the value of the Dämmerschlaf, but only to discover the biological action of the preserved solutions, the number of cases is sufficient for a test.

In his opening remarks Siegel comments on the great disadvantages under which the method of Twilight Sleep has always struggled because of the unreliability of scopolamin, which even when sterilized was apt to decompose.

"As the Dämmerschlaf is a state fluctuating between waking and sleeping, an exact dosage is of the greatest importance, and for this perfect dosage a reliability of the drug is a most important factor. With the scopolamin solutions varying considerably in their effect, according to their age, correct conduct of Twilight Sleep has been rendered most difficult and complicated. Now, at last, Straub has prepared a lasting scopolamin by the addition of soluble alcohol mannite. This preserved solution, when used in pharmacological and biological experiments, exhibits the same qualities as those shown in freshly made solutions."

To make the tests of his experiments more clearly observable, Dr. Siegel contrasts the results of his own use of preserved scopolamin-mannite with the

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statistics of 500 of Gauss's cases and 600 of Beruti's.

We find in the specified 500 cases of Gauss the following figures.

76.2 per cent.— successful Dämmerschlaf.
18.2 per cent.— reduction of suffering.
5.6 per cent.— no effect.

Beruti reports:

65. per cent.— successful Dämmerschlaf.
21.83 per cent.— reduction of suffering.
13.6 per cent.— no effect.

By combining the results of both Gauss and Beruti we get the following average:
Gauss and Beruti:

70.6 per cent.— successful Dämmerschlaf.
20. per cent.— reduction of suffering.
9.5 per cent.— no effect.

Now compare this average of results from use of freshly made scopolamin solutions with Siegel's results from use of preserved scopolamin which had been stored for over a year.

Siegel:

74. per cent.— successful Dämmerschlaf.
26. per cent.— reduction of suffering.
0. per cent.— no effect.

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One reaches the conclusion that even after many months of storage, mannite-scopolamin does not lose its effectiveness.

"Fresh solutions," says Siegel, "have been shown to produce but slight side effects, similarly, with preserved scopolamin, I have observed no subjective side effects. With an exception of a slight prolongation of the pains there were no objective effects.

"On the basis of my observation of several hundred Dämmerschlaf births with fresh solutions of scopolamin, I am able to state that the side effects of mannite-scopolamin do not occur more frequently than when using fresh solutions — I have even formed the conclusion that they are less. The duration of birth was normal.

"In the 22 cases, 22 children were born alive. There were 20 spontaneous births. Forceps had to be employed twice; (1) on account of narrow pelvis of mother and fluctuating heart sounds of child; (2) on account of prolapsis of the cord. The latter child died after forty-five minutes.

"These complications might easily have happened without scopolamin.

"Fifteen children were born lively.

"Six oligopneic.

"One apneic" (this was the case of prolapsis of cord when the forceps had to be used).

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" I wish emphatically to point out here once more that the condition of oligopnea is absolutely harmless to the child, and that the children come to without stimulation or assistance."

Siegel then refers to Salzberger's investigations of all the data of scopolamin births up to 1910 — including those of the opponents — which proved that only 1.1 per cent. died within the first three days.

Siegel concludes:

" From this report of my experiments it is to be seen that preserved mannite-scopolamin has given complete satisfaction and is, in its biological effect in obstetrical practise, in no way inferior to the fresh solutions.

" The most valuable fact is that we now have at last a *constant* scopolamin preparation. The direct consequence of this will be that we shall now be in a position to simplify considerably the formerly complicated method of Twilight Sleep.

" For months past we have now been employing the Hoffman La Roche preparation of Straub's mannite-scopolamin, which is to be obtained under the name of ' Scopolia-Haltbar.' "

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XVI

The Simplified Method Witnessed by the Visiting Physicians in the Summer of 1914

A GREAT many foreign physicians who visited the Freiburg Frauenklinik in the summer of 1914 were puzzled by the births which they witnessed in the fourth-class free ward.

They said: "The method which we have seen is certainly not the one we have been led to expect from all we have heard of the Gauss Dämmerschlaf."

One American doctor complained: "There we stood — six of us — for days and nights with our ears stretched to hear the far famed 'memory test' without ever getting the slightest satisfaction."

The fact of the matter was, these visiting physicians were not witnessing the Gauss Twilight Sleep as it was still conducted in the first-class ward by Drs. Krönig, Gauss, and Schneider with scopolamin-morphin and the memory test, but they were observing the experiments which were in progress in the

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fourth-class ward with the "Siegel Simplified Method."

In Dr. Siegel's former paper on his experiments with the Straub preserved scopolamin he gave us the first intimation that he believed with this new *constant* mannite-scopolamin it would be possible to simplify greatly the hither-to rather complicated Dämmerschlaf; with this theory he immediately went to work to develop a system of set, invariable rules to be conducted with invariable scopolamin.

Formerly, even when every precaution was taken, by having fresh solutions and subjecting every solution to the apatropin test by using permanganate of calcium, the scopolamin still showed a tendency to eccentricity; this factor consequently added materially to the difficulties of the physician who not only had to use the most tactful adaptation of the method to the individual peculiarities of the patient and her condition, but had furthermore to adapt the dosage to the individual peculiarities of the especial solution being used.

This was the greatest reason for the reiterated insistence of Gauss that only by the memory test could the effect be judged.

It has already been pointed out that in the larger surgical doses variability of scopolamin was not as

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noticeable as in the small, exact doses required in childbirth.

Now that there was at last at hand a constant scopolamin, whose behavior could be counted upon with a great degree of certainty, its first effect was to eliminate a large degree of uncertainty in the results which could be expected from its employment.

Of course nothing can ever change the fact that there are rare cases of patients with a peculiar idiosyncrasy to the drug, as well as to other narcotics, but these cases are so unusual they cannot be considered when developing a method for the use of thousands of normal mothers.

Dr. Siegel deserves great credit for trying to formulate a method for the medical masses, a method which requires no peculiar brilliance of technic, psychological discernment, or nerve-racking concentration on the part of the operator. It means that here is a method which can be as easily employed in private practise as in the lying-in wards of hospitals.

As one American doctor said to me in speaking of the Siegel method: "It will do this much without doubt — it will place Twilight Sleep on a simpler footing, whereby it will be within the scope of thousands of physicians of ordinary attainments, while the more psychological Gauss method could only be

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successfully conducted by the gifted and scientific hundreds."

Dr. Siegel [1] says that since Gauss introduced Twilight Sleep into practical obstetrical use in 1905 it has stood the test in many thousands of cases and that the method successfully attains its object of diminishing the suffering of mother or child. "All the objections raised by Bumm's clinic against the Dämmerschlaf may be considered definitely refuted in all points by enormous numbers of cases.

"Gauss's method, as I may be permitted to repeat briefly here, is based on the principle of regulating the scopolamin-morphin dosage by frequent repetitions of the memory test during the time of birth. What Gauss is aiming at is not to induce deep narcosis but a state which he calls Dämmerschlaf. Although the woman in labor will utter complaints during pains, she retains no memory of her suffering. When Dämmerschlaf is properly carried out the woman will not know anything of the events which have taken place during her Twilight Sleep, and she will therefore not remember any sensation of pain at birth.

"This method has, of course, the disadvantage, as

[1] "Painless Births in Dämmerschlaf, by a Simplified Method," by Dr. P. W. Siegel, Assistant at the University Clinic of Freiburg. Published in *Deutsche Medizinische Wochenschrift,* No. 21, 1914.

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has always been pointed out, that the progress of the birth has to be watched constantly by a trained nurse under the supervision of an experienced doctor. This requirement from the beginning limited the use of the Dämmerschlaf to the clinical wards. We have, therefore, never employed it in private practise.

"We have always aimed at simplifying the method. But this was not possible as long as scopolamin was a drug the efficacy of which was subject to great variation. A simplification of the method of Twilight Sleep could, of course, only be obtained after we got a drug of unvarying effectiveness. At the same time the further condition had to be met that the zone between Dämmerschlaf and deep narcosis should be wide and of limited variation in individuals."

Siegel believed that once provided with an alkaloid of unvarying efficiency, the effect upon individuals would not be subject to any considerable fluctuations, as in Twilight Sleep the physicians have to deal with neither the very young nor the decrepit, but with women in the prime of life.

"Straub's mannite-scopolamin, Scopolia-Haltbar, "Scopolamin durable" (Hoffman La Roche), has been found in our experience to meet this requirement in a very large measure. Straub has proved

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the durability by experiments on animals, and I attained the same Dämmerschlaf as that induced with fresh solutions.

"As Gauss has already pointed out in his publication, the dosage of morphin had to be most careful, as overdosing with morphin would in Twilight Sleep easily result in inconveniently long lasting, though harmless, apnea of the child."

Dr. Schlimpert had earlier made experiments with another Straub product, narcophin,[2] which he found affected the centers of respiration much less than morphin.

Dr. Siegel began experiments with this same narcophin when he attempted to simplify Twilight Sleep, and he found that it had no dangerous or menacing effects.

Siegel's procedure in simplifying the method was as follows:

"At first Dämmerschlaf was induced in a great number of cases according to the instructions given by Gauss, with preserved scopolamin and narcophin, using the memory test. After the birth, records were closely studied, and it was discovered that actually the doses of scopolamin—'durable' and nar-

[2] Straub's narcophin is put on the market by Böringer Söhne. I made inquiries of the largest wholesale British chemists and was told that it is not to be obtained in England.

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cophin necessary to attain a satisfactory Twilight Sleep varied but little in different individuals within a uniform period of time."

With this clue to a uniform result obtained by constant scopolamin, Siegel's next effort was to plan some set rule of dosage which would eliminate the "individualizing" formerly necessary in the handling of every separate case. It is immediately evident what a tremendous factor in the constitution of a simple, practical method this would mean.

With positive regulations for exact dosage at exactly stated intervals, to be administered alike to every patient, the element of possible failure (because of the lack of judgment or skill of the various operators) would be largely done away with.

It is almost staggering to think of the tireless amount of conscientious experiment it must have taken before Siegel could arrive at a positive dosage. As he says:

"It need scarcely be mentioned that the building up of this method has been preceded by a very large number of experiments.

"On the basis of these experiments, excluding cases of abnormally debilitated women, a table of dosages for the whole duration of the birth has been compiled."

I call your especial attention to the fact that with a

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worked-out system of set doses of invariable scopolamin, Siegel was now able to omit the memory test; this, more than anything else, proves the positive and systematized results which he obtained, and furthermore shows that at last a system of dosage had been found which could be administered to all patients without danger of overdosing. He says:

"Every case was now treated systematically in accordance with this table and *without* any control by the memory test."

You will observe in Siegel's method every *third* injection of scopolamin is combined with .015 g. narcophin. The doses are all given by hypodermic injections. Here is the table of doses to be administered at regular periods.

TECHNIC

"The dosage that has now been used by me in 220 consecutive cases is as follows:

Beginning with 1½ ccm. sco.+1 ccm. narcophin = .00045 g. sco.+.03 g. narcophin.

¾ hours after beginning 1½ ccm. sco.=.00045 g. sco.

1½ hours after beginning ½ ccm. sco.+½ ccm. narcophin=.00015 g. sco.+.015 narcophin.

3 hours after beginning ½ ccm. sco.=.00015 g. sco.

4½ hours after beginning ½ ccm. sco.=.00015 g. sco.

6 hours after beginning ½ ccm. sco.+½ ccm. narcophin=.00015 g. sco.+.015 narcophin.

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7½ hours after beginning ½ ccm. sco.=.00015 g. sco.
9 hours after beginning ½ ccm. sco.=.00015 g. sco.
10½ hours after beginning ½ ccm. sco.+½ ccm. narcophin=.00015 g. sco.+.015 narcophin.

and so on every 1½ hours ½ ccm. scopolamin (.00015 g.)."

The greatest proof of the lack of great depth of this narcosis is shown in the fact that, unlike the Gauss Dämmerschlaf, it becomes necessary in the Siegel method to employ a slight chlorethyl narcosis, in addition to the scopolamin and narcophin, at the actual passing of the head of the child.

With the Gauss Dämmerschlaf there is no necessity for this addition of chlorethyl, as the injections of scopolamin-morphin tide the patient as successfully over the climax of birth as through the ordinary labor pains; moreover, in the Gauss Dämmerschlaf the amnesia of the patient, where the passage of the head is concerned, is just as perfect as the obliteration of the memory of the rest of the process of birth.

Of the necessary addition of chlorethyl, Siegel says:

"It should be especially mentioned that when the head is cutting through, a small dose of chlorethyl of about 10 ccm. should be administered with the Herrenknecht mask. This is necessary, as Dämmer-

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schlaf is a condition half way between waking and sleeping. The Dämmerschlaf is sufficient to obliterate the memory of the usual labor pains, but it is not sufficient to maintain amnesia during the most painful moment in the act of birth, the passing of the head."

Siegel overlooks the fact that the Gauss Dämmerschlaf is also "a condition half way between waking and sleeping," and yet *is* sufficient to "maintain amnesia during the most painful moment in the act of birth."

Siegel continues, as if in answer to expected criticism:

"One might think that for the sake of simplicity the Dämmerschlaf ought to be deepened somewhat rather than introduce this new complication. A deeper Dämmerschlaf, however, would necessitate larger quantities of narcotics. A chlorethyl narcosis of 10 ccm., as is well known, has scarcely any effect on a person, at any rate it never does any harm.[8]

[8] Chlorethyl was first used as an anesthetic by Flourens in 1847, but it was almost forgotten until 1894 when it was rediscovered by a Swedish dentist named Carlson. It is closely related to bromethyl and produces a narcosis of very limited time. Many obstetricians, including Maurette, Lop, and Krönig, recommend it for obstetrical operations as excellent and harmless. It is said to be less dangerous than bromethyl and has less after effect. Its immediate effectiveness makes

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With a larger dose of scopolamin and of narcophin, however, the secondary effects might occur in a more pronounced manner. For this reason we prefer the chlorethyl narcosis."

Granting that chlorethyl is harmless, it is interesting to find him adding: "this chlorethyl narcosis is not *always* necessary. Only experience will enable the physician to decide whether the use of chlorethyl is advisable or not. It is only, so to speak, a safety valve by means of which the Dämmerschlaf can be satisfactorily attained in a larger percentage of cases.

"I had set myself the task of rendering the conduct of Twilight Sleep as independent as possible of individual dosage, and this apparently could best be done by supplementing the Dämmerschlaf by chlorethyl."

We cannot lose sight of the great effectiveness achieved by Gauss by his system of tactfully applied individual dosage, yet even though the Gauss method may be greater and its results unassailable, yet we must not forget that to get the same results which Gauss obtained the greatest conscientious care on the part of the operator is necessary, and Siegel is trying

it very valuable, but Krönig warns against prolonging a chlorethyl narcosis over a few minutes.

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to formulate a method devoid of difficulties for the physician.

Where injections of unvariable quantities are injected at stated times, overdosing (unless the injections were kept to the smallest effective quantity) would be much more apt to occur than when the injections were scientifically administered according to the apperception of the patient as judged by the memory test. Keeping the set doses down to their minimum effectiveness, it is perhaps unavoidably necessary to deepen the narcosis by the addition of chlorethyl at the passing of the head; as Siegel says, it would be very discouraging to see the result of a Dämmerschlaf, which had been successfully sustained for hours, rendered doubtful at the end, when by the administration of a small dose of chlorethyl it could be terminated triumphantly.

Of the time limit of this method Siegel says:

"Dämmerschlaf may be induced as soon as the obstetrician is satisfied that the birth process has begun, i.e., as soon as regular pains occur at opening of os. It is, as a rule, not necessary to await a definite opening of the os. I have successfully begun the Dämmerschlaf when the os was only two-thirds of an inch to one inch in diameter as well in primiparæ" (first child) "as also in multiparæ" (where

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the mother has had other children), " and I have not observed any protraction of labor. The pains of labor are, as a rule, called regular if in primiparæ they occur every five minutes and in multiparæ in from five to six minutes. It is in this stage generally that the labor also begins to become painful to the woman. It is less a question of labor having reached a certain stage, than that the process of birth is under way at all.

" In my 220 cases I was not obliged in a single instance to interrupt the Twilight Sleep. If once begun, the Dämmerschlaf could be carried through to the birth. Once, for instance, I maintained Twilight Sleep for thirty-one hours, once for thirty-three and in another case for thirty-nine hours without any symptoms of danger to mother or child having appeared. With the long duration of the Dämmerschlaf, of course, the total dose of scopolamin and narcophin increases. The largest number of injections given by me were twenty-four, twenty-five and twenty-seven injections. This means a narcophin dose twice of .15 g. and once of .165 g. and a scopolamin dose of .00405 g. .00435 g., and .0048 g. As these doses are distributed over a long period of time they are still below the maximum doses. At an average, of course, we use much less narcotics, as

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the birth will take its course within a much shorter time. At an average we gave six injections with .06 g. narcophin and .0015 g. scopolamin.

"Besides primary weakness of labor there is no counter indication against the use of Dämmerschlaf. Even in such cases it is doubtful whether it might not be used, but we have no experience in this respect."

Even in cases of narrow pelvis, Siegel says his method may be carried out with good results.

"Especial preparations for the Dämmerschlaf are not necessary. We have only to take care that the patient is talked to as little as possible, that there is no noise around her, and that the light does not fall directly on her face. Curiously enough, under Twilight Sleep women are remarkably sensitive to light. I therefore cover the woman's face with a handkerchief toward the termination of the birth as several times the patients stated that they knew nothing of the birth, but they had suddenly realized that many people were standing around them and that there had been a flood of light. This latter was the search light.

"It has to be taken into consideration that 197 cases were treated in the public delivery ward, without the women being isolated."

One hundred and ninety-six births were spon-

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taneous. Not including two cases of breech presentation, the proportion of operations was 10 per cent.

For comparison, Siegel compiled the operative statistics from the records of 1,000 consecutive births in which no narcotics had been used and found that there were 105 operations among this number — 10.5 per cent. Comparison of his figures with these shows his results to have been good.

"I must here draw attention to a very interesting fact. Among the seventy-eight spontaneous births there occurred only six times slight ruptures of the perineum = 7.5 per cent. Among the forty-nine cases of spontaneous second births and the eighteen spontaneous third births there was no rupture of the perineum. This great reduction of perineal rupture is very striking."

Having collected the records of 800 consecutive first births without scopolamin he found the record to be "percentage of rupture of the perineum 13.5 per cent."— that is, almost double the Siegel figures.

In only six cases did Siegel protect the perineum.

"This is proof," says he, "how very quietly the head passes over the perineum and how little the obstetrician is troubled by the woman in labor.

"A special advantage of the Dämmerschlaf is that

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if minor operations are necessary they can be carried out successfully in chlorethyl narcosis."

Of the results of his fixed dosage, Siegel says:

"Of the 220 mothers 193 had complete amnesia; that is, about 88 per cent. These women know nothing of the birth process passed through. With the exception of thirteen cases all had been administered chlorethyl narcosis.

"Of the 193 cases of complete amnesia only twenty-three, that is 12 per cent., recollected having smelt something or to have had a mask on the face. This recollection corresponds with the administering of chlorethyl. These are the cases then in which we may presume that the birth pangs would have been felt but for the chlorethyl intoxication. In all the other cases therefore chlorethyl was superfluous. It is difficult, however, to gage the necessity for the use of chlorethyl, and as it is really harmless, it may always be used conscientiously.

"In twenty-two cases (19 per cent.) partial success was obtained, as sometimes the patients stated to have felt the birth but could not account for long spaces of time during the birth process, or in other instances they spoke subjectively of a quite distinct diminution of pain.

"In five cases = 2 per cent., the injections had no effect as they were administered too late. . . .

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"Amnesia has been ascertained by me in the following manner: After the birth I used to ask the mothers whether they had already had their child, whether they had noticed any smell, whether they had had a handkerchief laid on their face and how many injections they had been given. It was found that amnesia begins between the second and third injection.

"Of the 193 cases of complete amnesia, 128 only remembered two injections, 49 three, 15 four, and 2 more than five injections. If we compare these figures with the table of dosages we see that Dämmerschlaf sets in at an average between ¾ and 1½ hours after the first injection. . . .

"In 30 instances I have asked the women how long they reckoned to have lain from the time of the first injection until waking from the Dämmerschlaf, and without exception they greatly underestimated the length of time. It is surprising to hear from a patient who has been sleeping from twenty-five to thirty hours, that she believes the birth only lasted three or four hours. From this it is evident that we had favorable results even in those cases where the patient by accident felt the birth but was otherwise under amnesia during a large part of the time; in other words, the larger number of cases which I have classified as partial success represent by them-

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selves a satisfactory result. If, for instance, such a mother had been kept in Dämmerschlaf for twenty hours, she would have the impression that she perhaps felt the birth but that it lasted a short time only, say from three to four hours. . . . If the Dämmerschlaf has lasted over twenty-four hours, it affords a curious spectacle to see how the woman's reckoning of time is displaced by an entire day. She wakes up, for instance, on Tuesday morning and will not be persuaded that it is not Monday morning.

"Pronounced secondary effects are cited as an argument against the Dämmerschlaf. Above all, stress is laid upon the statement that the births are extraordinarily delayed and that protraction of labor is caused by it. Pronounced protraction of labor I have observed only in 3 cases. In 28 cases there was moderate or only slight protraction. In 189 cases I did not notice any protraction of labor. I beg to state explicitly that among my cases there were 12 primiparæ of over thirty-one years of age. The oldest of these was thirty-nine years of age. . . .

"I have to draw the attention to the fact that every doctor when seeing Dämmerschlaf births for the first time implicitly gets the impression of a protraction of labor and shortening of pains. This im-

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pression arises as the woman in Twilight Sleep usually only feels the pains when at their height and utters only slight complaints or no complaints at all. Whereas, a woman in full consciousness utters complaints at the mere approach of pains and even long afterwards. In my opinion this easily explains the subjective impression of protraction of labor and abbreviation of pains, whilst by laying the hand on the patient's body the frequency and intensity of labor will be noticed to be much more favorable.

"Other side effects, especially those of scopolamin, are redness of the face, slight agitation, and vomiting. But all these states occur far less frequently than is always supposed. In 132 cases I did not notice any side effects whatever. In 73 cases flushing of the face occurred, in 58 cases agitation, 5 patients vomited. Reddening of the face is purely peripheral hyperemia[4] without any significance. This is shown by observation of the pulse, for the heart beats in my cases rose above 100 per minute in only nineteen instances, and even in these few instances the pulse never presented any threatening symptoms.

"The excitement of the patients is generally slight. I have observed really great excitement in

[4] Excess of blood only in the outer surface.

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six cases only. Our low number of cases of rupture of the perineum proves that the state of agitation is not so very great. If the patient would toss about, as has often been said, it would not be possible properly to protect the perineum, and there would be very frequent ruptures in consequence. . . .

"I have never been able to observe in any mother that the breathing center having been influenced by narcophin, caused a slackening of the breath. In 139 cases the breaths have been counted every three hours and they were found never to be less than sixteen nor more than thirty per minute.

"Further side effects there are none of any consequence."

AFTERBIRTH

"Afterbirth hemorrhages (atonies in connection with scopolamin), such as have been cited over and over again, have never been observed by me. The losses of blood have been measured by us, and only in 16 cases we ascertained a loss of blood exceeding 500 g. Only in 2 cases these heavy hemorrhages had to be ascribed to atony" (want of tone — abnormal relaxation). "Two hundred and nine times it was not necessary for us to take any steps on ac-

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count of loss of blood. We had to prescribe styptic medicine" (to cause contraction of tissues of the blood vessels), "such as secacornin, only in 2 cases. . . ."

CHILDBED

"In childbed also, as a rule, we had no symptoms. Two hundred and five mothers were able to leave the clinic within the first ten days after parturition; the remaining 15 mothers showed only slight increase of temperature. One hundred and ten patients got up for the first time on the first day, 10 patients on the second day after the birth. With the exception of one woman, all patients made gymnastical exercises. One hundred and sixty-one women did not complain about thirst, 44 had moderate, and 15 women had a lasting sensation of thirst. But even in these cases the dryness of the mucous membranes is *far less* than that observable in operations. Two hundred and thirteen mothers were able to nurse. The other seven did not nurse on account of the death of their children. Only in 2 cases was the milk secretion not sufficient. There is, therefore, no reason to talk about the Dämmerschlaf having a harmful influence upon childbed or lactation."

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THE CHILDREN

"Of the 220 infants, 148 were born absolutely lively. Sixty-one were oligopneic, 4 apneic, and 4 asphyctic. Two children were stillborn, and one child had to be perforated on account of fever in the mother. Of the asphyctic children, two were resuscitated successfully, the other two died after three-fourths of an hour and one and one-half hours of efforts at resuscitation. The condition of the children expressed in per cent. reads as follows:

	per cent.
148 lively children	= 67.6
61 oligopneic children	= 27.7
4 apneic children	= 1.7
2 asphyctic children, lived	= 0.85
2 asphyctic children, died	= 0.85
3 still-born children	= 1.3

"The mortality of the children at birth is therefore extraordinarily low — 2.15 per cent. including the two asphyctic children. . . .

"Of the 220 children, 213 left the clinic alive and healthy. The total mortality at birth and within the first days of life is only 3 per cent. This is a very good result and corresponds completely with observations hitherto made on scopolamin children.

"On the basis of this low infant mortality it ap-

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pears scarcely justified to attribute to Twilight Sleep a harmful influence on the children.

"It is seen also that the often objected to state of oligopnea is absolutely harmless to the infant's life. Oligopnea, according to Gauss, is a state of slight intoxication of the child, a certain percentage of which can, unfortunately, not be avoided. The heart is beating actively, and when blown upon or touched, the children made defensive movements. The oligopnea in 34 cases lasted up to five minutes, in 21 cases up to ten minutes, and in 4 cases up to fifteen minutes, in 1 case twenty, and in another twenty-five minutes.

"In order to see how the oligopneic children behave without assistance, I have in 22 cases not taken any steps whatever. I laid the children on the table and did not interfere with them. All these children attained a normal condition unaided by me within the above mentioned time limits. Among these unassisted children there was also the case of oligopnea lasting twenty-five minutes. I believe that this is sufficient proof that oligopnea by itself does not need any treatment, and that an oligopneic child will recover a lively condition without assistance. I frankly admit that with insufficient experience it is rather difficult to distinguish between oligopneic and apneic children. One lacking ex-

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perience ought to assist such children with slight mechanical stimulation. This treatment will not do any harm. If the case was oligopnea, the treatment was superfluous; if it was apnea, nothing had been omitted.

"In order to afford a survey of my cases, I may only mention that in 167 cases no treatment was given to the children. . . .

"The child is harmed by Twilight Sleep as little in its extra-uterine" (after-birth) "life as it is endangered by its intra-uterine" (before birth). "The Dämmerschlaf has no influence upon the fetus's heart sounds. . . .

"When leaving the clinic, 36 children had reached or passed their weight at birth. If we consider that only 12 women stayed longer than ten days at the clinic, the variation in the weight of the children may be accepted as absolutely normal. A diminution of the weight of a child by more than one pound has never been observed.

CONCLUSION

"A résumé of my experiences shows that we possess in the combined mannite-scopolamin-narcophin treatment, as per my table of dosages, a very handy method of Twilight Sleep. But it is not absolutely ideal. However, with its 88 per cent. of com-

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plete success and the 10 per cent. of partial success, its insignificant side effects on the mother and child, it represents to-day the best of all known methods for lessening pain at childbirth.

" Its advantage consists in the easy technic. Any individual preparation in each case is superfluous. Every patient is given mechanically, at the exact periods stated, the prescribed doses of scopolamin and narcophin.

" The rest of the birth process takes place with exactly the same accidents or complications that may occur also in any births without Dämmerschlaf.

" I know very well that with greater experience some cases may be treated more individually; that in many patients a smaller dose, and in others a slightly larger dose would give better results. But I have adhered to the table of dosages on principle, as I wanted to work out a simplified method.

" The number of 220 cases is still so small that I would not care to recommend this method for general practise, but I believe that it is well worth being tested in other clinics in order rapidly to accumulate more data of observation."

Apropos of the Siegel method, I want to tell you of a representative case of an American visiting physician; this woman doctor came to Freiburg with only ten days left before her return to America;

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after witnessing (together with another woman physician from Maine and four male American doctors) five births in the fourth-class ward, she found herself in a fearful state of perplexity, indecision, and even fright.

She had heard much of the "Gauss Dämmerschlaf" in the Berlin, Munich, and Vienna clinics, and she had come to Freiburg to study, as far as she could in that length of time, the Gauss method,. because she had a friend in Canada of thirty-eight years of age who was to soon give birth to her first child and this doctor believed Twilight Sleep would be just the thing for this case.

It occurred to none of the Frauenklinik German doctors in the fourth-class ward to explain to these visiting physicians that the new Siegel method was there being tried out.

The first shock to the Americans was that no memory test was used; then they found morphin supplanted by narcophin; moreover, as accident so decreed, all five of the first children whom they saw born were oligopneic, and the inexperienced physicians of the fourth-class ward hurriedly used artificial means to revive them.

One of the other doctors who witnessed these same five births said: "If I had charge of such births I would be gray in a week."

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To show you further to what conclusion even experienced physicians may wrongly arrive, one of these doctors told me, with horrified, frightened face, that the oligopneic condition of the children was so dreadful that the German doctors in the fourth-class ward actually had to run a tube down the children's throat and pump air into them!

Curiously enough, the following day at the university library, while hunting in the *Munich Medical Weekly* for something else, I came across an article on the use of the "tracheal catheter" for removing the amniotic fluid from the bronchial tubes of the child, and it suddenly occurred to me that *this* was what the visiting physicians had seen at the Frauenklinik.

I hastened to communicate my supposition to the American doctor, but I found that she had already had her mind relieved that very day by being told by one of the Frauenklinik physicians that the use of the tube had nothing whatever to do with oligopnea, but was only an extra precaution taken to remove any possibly inhaled amniotic fluid from the child's tubes.

To show the great state of general alarm of this physician (who was the most absolutely conscientious doctor I have ever met), she then asked me — knowing of my preparations for this book:

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"Do you realize your great responsibility?"

She meant, did I realize that I was recommending all women to urge their physicians to adopt a method which she believed, after witnessing five births, to be dangerous to the child. It will be interesting to see how her opinion was later on changed.

I introduced her to an American mother who had just been delivered a few days before by Drs. Krönig and Gauss. After hearing this mother's experience, the physician was in a worse state of puzzlement than ever, for the American mother told of the memory test. Her husband corroborated and enlarged on all her statements from his observation of the early stages of the birth — before he was expelled from the room by Dr. Gauss.

The husband assured the doctor that he had heard the memory test applied, and that morphin, not narcophin was used — here he handed her the Frauenklinik record of his wife's delivery with the quantities of the injections clearly stated and all other details of the birth. Furthermore, he had seen his son immediately after birth and he was certainly not oligopneic, but crying and kicking lustily while his mother calmly slept on unperturbed.

"Why!" exclaimed the American doctor, "I am listening to the description of an entirely different

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method from the one I have seen in the fourth ward."

Her state of perplexity was so great she felt nothing could clear it but a conversation with Dr. Krönig himself. After telling all her conflicting impressions to Dr. Krönig, he explained to her that the physicians and nurses of the fourth-class ward were trying out a simplified method of Dr. Siegel's which was not synonymous with the Gauss Dämmerschlaf as conducted in the first-class ward.

On hearing the American's alarm at the condition of the children at birth, Dr. Krönig said, that while the Siegel method was as yet only in the experimental stage " it is at least already helping to lower the already low infant mortality statistics of the Frauenklinik."

Krönig was violently upset over hearing of the artificial efforts at resuscitation of the infants resorted to by the fourth-class physicians, excitedly exclaiming: " It is entirely unnecessary — it is all foolishness. It is their inexperience that makes them think it necessary. I will see to it immediately."

With a better understanding of the conditions and the two different methods of Dämmerschlaf, the American doctor returned to her investigation of the births under the Siegel method, and in four days

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her whole attitude of mind had cleared and changed.

"I am thankful that I could be here for the last four days and nights," she declared at leaving; "it has changed my whole opinion of scopolamin-morphin; but alas! several of the other doctors, who witnessed the first series of births, have gone before there was a chance of their understanding and coming to different conclusions.

"During those first five births I felt convinced from the start of the absolute safety and benefit to the *mother,* but I felt alarm for the safety of the child; now I have changed the latter opinion entirely since a more thorough investigation of the oligopneic condition.

"Since my conversation with Dr. Krönig, the babies have been left alone in the fourth-class ward, and just as he said, they have revived of their own accord within fifteen minutes.

"Moreover, I find that it only so chanced that all the first five children were born oligopneic; in the last four days and nights the majority of children have been born in an absolutely normal condition.

"Now, too, that I thoroughly understand the Siegel method of fixed dosage, which can be used without the memory test, I have come to a still more important conclusion, and that is that scopolamin is *not* the dangerous drug it has been supposed to be.

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I feel that in order really to know anything of Twilight Sleep, a physician should remain at the Frauenklinik for a year, but as that is now impossible for me I shall have to make the best of my ten days' and nights' investigation and with a full realization of my inadequate preparation I shall nevertheless try the method as soon as I get home with a determination to work it out conscientiously for myself in the form of a *combined* Gauss and Siegel Dämmerschlaf. I now believe entirely in the use of scopolamin-morphin in childbirth. I believe it is absolutely safe for the mother, that it ensures her painlessness and a quick recovery after birth, and I believe that it is absolutely safe for the child."

This woman physician's opinion is worth listening to, as she has a record of twelve years of maternity cases with only one case of forceps.

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XVII

The American Physicians and Painless Childbirth

THROUGHOUT the American medical press have been published articles severely criticizing the publicity given Twilight Sleep.

We are accused of pretending to discover a new method which — to quote the *Journal of American Medical Association* —" while not entirely obsolete, has been practically discarded."

Do the records in this book make it appear that the method is either new or obsolete?

The *American Journal of Clinical Review* says:

" The procedure is already well-known to thousands of physicians in the United States who have unostentatiously practised it for at least a decade. To suggest that Krönig and Gauss have a monopoly on this painless childbirth business by means of scopolamin-morphin — that is to laugh."

If the American physicians have been " unostentatiously practising " this method for at least a

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decade, why have we American mothers heard nothing of it?

It is fortunately quite true that Krönig and Gauss no longer have a "monopoly" of the method, as the many records of other obstetricians which I have collected prove. It is, moreover, being used in Great Britain with especial success.

When my article on "Painless Childbirth" was published in *The Ladies' Home Journal,* the opinions of "Eminent Obstetricians" were simultaneously published.

They are as follows:

THE OPINIONS OF EMINENT AMERICAN OBSTETRICIANS

"The use of scopolamin-morphin as an anesthetic in labor is no new thing: introduced by von Steinbüchel in 1902, it has been tried in this country, as well as in Europe, by numerous obstetricians. My own observations, published in 1903, led me at the time to favor this therapeutic means of producing the 'Twilight Sleep' and removing the consciousness of pain, or at least preventing all remembrance of it. I have long since abandoned this agent, however, for two reasons:

"First, because it has apparently been the cause occasionally, of fetal asphyxia.

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"Second, because the effect of the drug on the mother is often uncertain, and unless used with great care may cause unfavorable or dangerous results.

"Moreover, we have other and safer measures for the relief of pain in labor. So I have given up teaching the use of scopolamin in my lectures.

"CHARLES M. GREEN, M.D.,
"Professor of Obstetrics and Gynecology in Harvard University."

"We have used the scopolamin treatment of childbirth in two separate series of cases at the Johns Hopkins Hospital. But in neither series were the results satisfactory, nor did they in any way approach the claims made for the treatment. We expect to do more with it next year. In the meantime my own experience and conversation with Professor Krönig do not make me feel that the method really constitutes a great advance over those which are in use by American physicians.

"J. WHITRIDGE WILLIAMS,
"Professor of Obstetrics, Johns Hopkins Medical School."

"The mitigation of pains of childbirth has always been the anxious concern of physicians all over the world, but more than ever since the discovery of chloroform and ether and their use for this purpose.

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In recent years several methods have been proposed that it was hoped might prove superior to the agents formerly used. Among these was the hypodermic injection of morphia and scopolamin to produce semi-consciousness and indifference to pain, or what the Germans call 'Twilight Sleep.' As long ago as 1903 a monograph appeared in Vienna, advocating this treatment. American physicians, quite as progressive as any others in the world, tried this method in our largest maternities. Among other places it was employed in the Maternity of the University of Pennsylvania, in a series of cases over a period of two years. My experience with it coincided with that of my colleagues in this and other parts of the world. If enough morphia was given to abolish pain there is too much danger of hemorrhage in the mother and asphyxia in the child. The scopolamin does not diminish pain, but simply quiets restlessness.

"As a member of the Gynecological Touring Club of America, in the summer of 1912, I had the privilege of observing this method at Freiburg in the clinic under the superintendence of Professors Krönig and Gauss. It was interesting to hear that the morphia was employed in a single moderate dose, followed by small quantities of scopolamin. Evidently the disadvantages of the treatment —

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hemorrhage and asphyxia — had necessitated this modification. My conclusion from this observation and from my own experience was that the quantity of two drugs being insufficient to abolish pain, the results secured in this clinic were partly psychological — that is, the patients were assured beforehand that there would be no suffering; were delivered in a quiet dark room; were given one moderate dose of morphia and became temporarily under its effect; and, being told afterward they had had no pain, probably left the institution impressed with that belief.

"BARTON COOKE HIRST, M.D.,
"Professor of Obstetrics, University of Pennsylvania."

"In November, 1913, I spent four weeks in Freiburg and had the opportunity to observe personally and study critically about ten cases of childbirth conducted in Professor Krönig's own clinic. The impressions received and opinions formed were decidedly unfavorable to the method of 'Twilight Sleep.'

"In all ten cases the birth pains were weakened and labor prolonged; in two of the women for almost two days. In three cases pituitrin had to be given to save the child from imminent asphyxia.

"In five cases instruments had to be used. In

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my opinion two of these were directly rendered necessary by the paralyzing effects of the drugs scopolamin and morphin. Extensive lacerations resulted.

"Several of the women became delirious and so unruly that ether had to be administered in addition to the scopolamin and morphin, the result being that the infants were born narcotized and asphyxiated to a degree. One had convulsions for several days.

"All these occurrences confirmed my own experience with the drugs. I had used them when first proposed twelve years ago. At that time they were extensively employed in Europe and America, but were soon discontinued because they were found impractical and dangerous.

"I visited the famous maternities of Berlin, Vienna, Munich, and Heidelberg; in all of them upon inquiry I was told that this method had been tried and discarded.

"JOSEPH B. DE LEE, A.M., M.D., F.A.C.S.,
"Professor of Obstetrics, Northwestern University Medical School; Obstetrician to the Chicago Lying-In Hospital, etc., Author of 'Principles and Practice of Obstetrics,' 'Obstetrics for Nurses,' etc."

It does not seem characteristic of American justice to issue such blanket rejections as are contained

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in the foregoing repudiations of Twilight Sleep.

The most effective surface weapon which can be brought to bear on anything is to say, "I have tried it and it has failed." But we have a right to ask, "*How* did you try it?"

Did these obstetricians observe the carefully worked out regulations of Gauss — the man who after laborious experimentation was at last able to formulate rules of procedure by which successful results could be obtained?

How many of the obstetricians have ever read the Gauss publications?

If these eminent doctors have failed so signally where so many European obstetricians have succeeded, then it is clearly evident that the American methods of Twilight Sleep need entire revolutionizing.

The other reports which you have read from many different parts of the world prove that when scopolamin-morphin is properly employed it constitutes a safe, reliable method for the relief of women in childbirth.

Let us take up these condemnations in turn.

Dr. Green of Harvard has abandoned Twilight Sleep (1) "because of asphyxia of the child."

Let a European obstetrician answer this objection for us.

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Dr. Max Salzberger of Kulm says:

"Only could asphyxia ever be proved to be due to scopolamin where it can also be proven that the injections caused an abnormal length of birth. For this, statistics would have to be kept of asphyxiated children born both with and without scopolamin injections."

If Dr. Green means by asphyxia that state of intoxication in the child known in Germany as oligopnea, then I shall ask you to turn back to Chapter XII.

Asphyxia and oligopnea are two entirely different conditions. Asphyxia is always extremely dangerous, while oligopnea is a temporary intoxication of the child which is conceded by general medical opinion to be without danger.

When a child is born in this intoxicated condition it is proof that the mother has been inadvertently overdosed, and overdosing can be avoided if the doctor employs the proper precautions; therefore a high per cent. of oligopneic children is an arraignment of the obstetrician and his careless technic, not of the method.

(2) "Because the effect of the drug on the mother is often uncertain, and unless used with great care may cause unfavorable or dangerous results."

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Regarding the uncertain effect upon the mother, as we know from the doctors' records, there are *very* rare instances of patients who show an individual idiosyncrasy to scopolamin; but, as Tichauer, Krönig, and many other physicians point out, it would be most unfair to deprive thousands of women of the relief of Twilight Sleep, because of the eccentric constitution of one woman in, say, five thousand.

The mothers, whose experiences I have transcribed in this book, were not selected cases. Certainly none of these women reported uncertain results and their experiences are entirely characteristic.

In sixty-nine medical reports, only one doctor reports that there was any dissatisfaction with the method on the mother's part — two patients of Dr. Preller's expressed dissatisfaction. (See Chapter VIII.)

Any method of narcotization necessitates "great care." We surely have a right to expect and demand from all physicians great care in the use of any chemical.

Those obstetricians who have followed Gauss's instructions to the letter, who have conducted the Dämmerschlaf with "great care," do not report "unfavorable or dangerous results."

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If a medical procedure is to be shunned merely because it demands great care on the part of the operator, then all major operations should be avoided for the same reason.

(3) "Moreover, we have other and safer measures for the relief of pain in labor."

Surely the world has a right to share Dr. Green's secret.

Europe would rejoice to hear of these "safer measures" for, as August Johnen of Mankarthof says:

"At any rate the scopolamin-morphin narcosis is the one which is to-day *the best* with regard to lessening the suffering at birth, and it surpasses the semi-narcosis of chloroform and ether on account of its easier and more convenient application as well as because of its *less dangerous* character."

Another American, Dr. Birchmore, speaks of scopolamin-morphin as the "ideal anesthetic," an anesthetic which is "without risk to either mother or child."

Dr. Williams of Johns Hopkins says he has employed scopolamin-morphin in two separate series of cases without satisfactory results, nor did they in any way approach the claims made for the method.

Dr. Williams does not state the dose employed.

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If he did not get the results "claimed for the method," it argues that he did not obey the rules of that method. However, as Dr. Williams says he expects to do more with scopolamin-morphin next year, it shows at least that he is open-minded, and hopes to profit by former mistakes — for such open-mindedness we mothers should be grateful and full of admiration.

Dr. Hirst of the University of Pennsylvania says:

"My experience coincided with that of my colleagues in this and other parts of the world. If enough morphia is given to abolish pain there is too much danger of hemorrhage in the mother and asphyxia in the child. The scopolamin does not diminish pain but quiets restlessness."

Let us take up his objection backwards:

"Scopolamin does not diminish pain, but simply quiets restlessness."

Dr. Hirst completely ignores the fact that the combination of scopolamin with morphin forms a practically new drug.

To quote Gauss:

"As a matter of fact, recent laboratory researches have made it appear that in scopolamin-morphin we have not, as was formerly believed, two independent substances acting in conjunction, but a

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new combination which acts in a completely different way from its individual components."

Tichauer says:

"The peculiarity of this anesthetic consists in the fact that each component assists the narcotic action of the other, whilst in other respects they are mutually antagonistic."

Preller of Mannheim says:

"The combined drugs act mainly upon the nervous system."

Of the effect of scopolamin, Krönig says:

"Scopolamin brings about a disturbance of the circulation of such a kind that the pain perceived by the nerves is not felt by the woman — there is a disturbance of association which makes the apperception of pain impossible."

Here are some other professional opinions on the workings of scopolamin:

Ernst:

"Before sleep begins scopolamin produces a diminution of the reasoning powers of the brain."

Dr. Gertrud Slawyk of Strassburg:

"The effect of scopolamin upon the human brain constitutes the drug as a much-used sedative and hypnotic chemical."

According to the investigations of Finck:

"By scopolamin the cortex of the cerebrum is

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completely cut off from the reflex columns of the spinal cord."

The alienists agree that scopolamin has a direct effect upon the brain. Sohrt and Bumke (alienists) describe scopolamin as having "the psychical effect of decreasing excitability of the brain." It is the disorganizing effect of scopolamin upon the memory which is the foundation upon which Twilight Sleep is based.

"If enough morphia is given to abolish pain there is much danger of hemorrhage in the mother."

In answer to this statement of Dr. Hirst's it is well to remember that Gauss's average blood loss in his *first* five hundred cases was only 382 grams. In the statistics of his first one thousand cases it is proven that in 92.8 per cent. of the cases the blood loss was normal.

Read on further — Dr. Hirst says:

"It was interesting to hear"— at the Freiburg clinic —" that the morphia was employed in a single moderate dose followed by small quantities of scopolamin. Evidently the disadvantages of the treatment — hemorrhage and asphyxia — had necessitated this modification."

Dr. Hirst confesses in this remark that he knows absolutely nothing of the Gauss Dämmerschlaf.

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Gauss says in his Carlsrhue address of 1911: "In the six years of the Dämmerschlaf there has been no change in the technic."

Only in Gauss's very first experiments was too much morphin ever employed — the dose then being .015 g. for first injection and .005 g. for subsequent ones. This dose was quickly reformed to the present single injection of .01 g. morphin, not because of hemorrhage, but because Gauss considered the morphin responsible for the intoxication of a certain per cent. of the children.

That hemorrhage is not a "disadvantage of the treatment" is proven by the following reports of European obstetricians.

Frigyesi:

"No serious cases of atonic hemorrhage."

Mayer:

"No atonic hemorrhage."

Buist of Dundee:

"Evidence of atonic bleeding is not decisive."

Krönig:

"Loss of blood after birth does not exceed physiological quantity."

Cremer:

"Atonic hemorrhage and other accessory effects cannot, without further definite proof, be laid at the door of scopolamin-morphin."

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Ziffer:

"No increase of blood worth mentioning."

Weingarten:

"No severe hemorrhage in the period of afterbirth was observed."

Even in Hocheisen's dreadful series of mismanaged cases he only had five cases of atonic hemorrhage!

And here is an American who changed his first opinion on this matter:

Dr. F. S. Newell said at the American Gynecological Society, 1906:

"Scopolamin-morphin does not often give trouble nor does it interfere with labor, but a tendency to relaxation of uterus and hemorrhage is a danger."

In a report on further experiments in 1907 with 123 cases he says:

"No hemorrhages. Rarely any relaxation of uterus."

As for Dr. Hirst's statement, "my experience coincided with that of my colleagues in this and other parts of the world," a study of my reports from "other parts of the world" prove that Dr. Hirst and his American colleagues hold a very isolated and lonely position on this question of Twilight Sleep.

The almost theatrical conclusion reached by Dr.

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Hirst is really the most original one which has been arrived at by any obstetrician.

Here it is:

"My conclusion, from this observation and from my own experience, was that the quantity of the two drugs being insufficient to abolish pain, the results secured in this clinic were partly psychological — that is, the patients were assured beforehand that there would be no suffering, were delivered in a quiet room, were given one moderate dose of morphia and became temporarily under its effect and being told afterward that they had had no pain probably left the institution impressed with that belief."

So Dr. Hirst concludes that the Twilight Sleep is entirely a manifestation of Christian Science or New Thought, and that all the European obstetricians are entirely deluded in placing it in the realm of scientific obstetrics. If we must believe Dr. Hirst and conclude all European obstetricians, surgeons, and alienists to be entirely wrong in attributing narcotizing qualities to this combination of scopolamin and morphin, can we then believe that Krönig and Gauss have been able by mere mental suggestion to fool over 5,000 women into believing that they were entirely oblivious of the entire process of birth? Is it credible that these women, after

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being "temporarily under the effect" of the *very small* injection of .01 g. morphin, on "being told afterward that they had had no pain left the institution impressed with that belief"?

Really — as Dr. Krönig says — it shows "the desperate corner into which the opponents are driven."

Dr. De Lee of the Northwestern University spent the extended period of four weeks "personally observing and critically studying *about* ten cases of childbirth conducted in Professor Krönig's own clinic."

After this profound and prolonged critical study, Dr. De Lee is able to dispose in a few words of a method which Drs. Krönig and Gauss have studied for over nine years.

"The impressions received and opinions formed were decidedly unfavorable to the method of Twilight Sleep.

"In all ten cases pains were prolonged."

Here are the opinions of European doctors on this side of the question:

Brodski of Moscow (200 births):

"The narcosis has no unfavorable effect upon duration of birth."

Bass of the Chrobek Clinic of Vienna (107 births):

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"The pains were never slackened. Scopolamin-morphin never caused the slightest retardation of birth."

Laurendean:

"No unfavorable influence on the birth pains."

Ziffer:

"Retardation of birth was only observed five times but this was never due to injections. In general, a regulating action on the birth pains was observed."

Mayer of Marburg:

"Out of fifty cases only in two instances were the labor pains less, and even in these cases it cannot be said that scopolamin was to blame. Diminution of the labor pains by scopolamin-morphin has never been conclusively proved."

Constance E. Long of London:

"Protraction of birth beyond the average duration was not observed."

Weingarten of Giessen:

"A reduction in the strength of labor did not occur in any case. On the contrary, the pains were only influenced favorably. In some cases the intervals were shorter and in other cases violent pains occurring at too short intervals were made normal."

Preller of Mannheim:

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"The duration of birth was not appreciably increased."

Frigyesi of Budapest:

"On the whole no lengthening of the total time of birth was noticeable."

Wartapetian of Jena:

"The intensity and frequency of the pains was very little affected."

Lehmann of Carlsrhue, though employing much larger doses than those of Gauss, says:

"There is no appreciable deleterious influence upon the course of birth."

Tichauer:

"From the results of all statistics we are certainly entitled to say that at the worst the birth is only retarded to a quite inappreciable extent."

Von Steinbüchel:

"No weakening of labor."

Puschnig:

"The labor is regulated; the cooperation of mother and the period of afterbirth are normal."

Pisarewski:

"The labor and birth process are accelerated."

Tichauer says of Dietschy, Fabre, and Bourrett:

"Where effect on labor pains and length of birth are concerned, their results correspond with those of Gauss."

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Matwjejew:

"I observed acceleration of the birth process."

Beruti of Buenos Aires (600 births):

"No essential influence upon process of physiological birth."

As far back as Gauss's first report, the duration of his Twilight Sleep births only averaged sixteen hours and eleven minutes.

Even in Hocheisen's 100 mismanaged cases, in 64 instances the birth pangs were not unfavorably influenced, and in some cases even increased in regularity and strength.

Krönig says:

"If the drug is administered in the proper doses no unfavorable influences upon the course of birth can be proved."

To quote Dr. De Lee again:

"In five of the cases instruments had to be used. In my opinion two of these were directly rendered necessary by the paralyzing effects of the drugs scopolamin and morphin."

In Gauss's statistics dealing with his first 1,000 births, the total per cent. of forceps was 7.32, while the per cent. of forceps in the last 500 of these cases was only 4.95.

To quote Gauss:

"In 163 private scopolamin births, not included

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in my 1,000 clinical cases, I did not use the forceps in a *single* instance."

In 1911 in his Carlsrhue address Gauss says: "The frequency of forceps at the Freiburg Frauenklinik has settled down to an average of 6–7 per cent."

Dr. De Lee says:

"Extensive lacerations resulted."

The fact that almost every mother delivered at the Frauenklinik is able to get up the first day after birth proves it untrue that mothers are frequently lacerated. It is interesting to here recall all that Dr. Birchmore (also an American) has said on the subject of rupture of the perineum and how especially he pointed out the reasons why there is less danger of lacerations when scopolamin-morphin is employed. (See Chapter IX.)

Dr. De Lee's assertion that several women became delirious and so unruly that ether had to be administered — one having convulsions for days — is in such contradiction to all that Krönig, Gauss, and Siegel have reported that it seems unnecessary to add more conclusive testimony. Dr. Siegel's low per cent. of rupture of the perineum — 7.5 per cent. — proves the great quietude of the patients under Dämmerschlaf.

Dr. De Lee furthermore says:

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"All these occurrences confirmed my own experience with the drug." What frightful mistakes in technic and dosage there must have been if Dr. De Lee's patients always suffered from weakened labor, forceps, lacerations, delirium, and convulsions.

He goes on to say of his experience with scopolamin-morphin:

"I had used them when first proposed twelve years ago. At that time they were extensively employed in Europe and America, but were soon discontinued because they were found unpractical and dangerous."

Von Steinbüchel made the first experiment with scopolamin-morphin in childbirth in 1903 — only eleven years ago. Up to that time this combination had only been employed by Schneiderlin and Korff in surgery.

The next obstetrical experiments following von Steinbüchel's publication of his results were those made by Wartapetian at the Woman Hospital at Jena. Next followed the experiments of Weingarten at Giessen. These were absolutely the *only* early obstetrical experiments with scopolamin-morphin.

So we see that "twelve years ago" no use of scopolamin-morphin in childbirth had ever been made.

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Dr. De Lee's claim that these drugs were at that time — 1902 —" extensively employed in Europe and America " is entirely unsupported by all medical literature.

As for the use of scopolamin-morphin being " soon discontinued because they were found unpractical and dangerous," I need only refer you to the reports contained in this book which show to what extent experiments are still being continued throughout Europe and Great Britain with ever-increasing good results.

" I visited the famous maternities of Berlin, Vienna, Munich, and Heidelberg and in all of them upon inquiry I was told that that method had been tried and discarded."

If the method has been abandoned at the Berlin Charité we of course know why — because of Hocheisen's failure and Bumm's opposition; but what about the Berliner Klinic and Dr. Bruno Bosse's great success with Twilight Sleep?

In Vienna, Twilight Sleep is employed at the Chrobek Clinic, the early experiments there being first reported upon by Dr. Oscar Bass.

Should any mother in Munich desire painless childbirth she may obtain it by applying to Dr. Doderlein, or his assistant, Dr. A. Zinsmeister, at the Munich Frauenklinik. They report in 1913

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that this "semi-narcosis is a great blessing to the mothers."

As for Heidelberg, I have no records from this city, so I cannot refute Dr. De Lee's statement that the method has there been tried and discarded. However, Lehmann of Carlsrhue and Krönig and Gauss of Freiburg are to be reached by only a few hours' travel from Heidelberg, so Twilight Sleep is fortunately within the reach of all Heidelberg mothers.

Now I want to say a few words in regard to the "investigations" which were made by visiting physicians — including the Americans — in Freiburg.

Unfortunately, both for Krönig and Gauss as well as the visiting doctors, it is only possible that medical visitors be permitted to witness the births in the fourth-class free wards. The German physicians of this ward are in the earliest process of training; they must, in fact, remain here for six years before proceeding to higher wards. The fourth-class midwives are also in their initial stage of training. Naturally the cases of these men and these nurses are by no means representative, and Twilight Sleep as here conducted is a very different matter from the Twilight Sleep of Krönig and

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Gauss in the first-class ward. It is just the difference that is to be expected in any work that is being done on the one side by amateurs and on the other hand by experts.

To show you the difference in the results obtained in the different wards and how much separate rooms, exterior conditions, and the personal science of the doctors has to do with successful Dämmerschlaf, I want to give you the following statistics of a series of 600 births occurring in the four wards of the Frauenklinik.

In the first-class ward (where the patients are in separate rooms and there is no examination by students), amnesia was obtained in 81.81 per cent.

In the second-class (where there are a number of patients at the same time but no examination by students), amnesia was obtained in 70.5 per cent.

In the third-class (where there are a larger number of patients together and examination by students), amnesia in 61.10 per cent.

In fourth-class free ward (for the training of midwives and students), amnesia was obtained in 60.79 per cent.

Furthermore, in the yet unpublished record made by Dr. Kurt Hellwig of the Frauenklinik on 600 births extending from August, 1911, to December,

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1912 (when there had been 3,600 Dämmerschlaf births at the Frauenklinik), Dr. Hellwig draws especial attention to the contrast of the figures of successful Dämmerschlaf in the first- and second-class wards from those of the third- and fourth-class: First-class, 73.3 per cent.; second-class, 70.4 per cent.; in the third-class, 51.6 per cent.; fourth-class, 53.2 per cent.

Moreover, during the past year, as you have read, the new simplified method of Dr. Siegel was being tried out in the fourth-class ward of the Frauenklinik.

The visiting physicians, after witnessing a few of these wholly unrepresentative births, arrive at positive conclusions on the merits or demerits of the method of Twilight Sleep. When, as is the case of a body of visiting physicians, Krönig or Gauss make addresses to the physicians, these addresses are delivered in German and are therefore of little assistance to doctors who do not understand that language.

When Professor Krönig and Dr. Gauss were planning to deliver addresses at the foreign meetings of medical associations (such as Gauss at Chicago and Krönig at Sheffield), they prepared their papers in German and these were then translated into English by Mr. Hill of the Berlitz School in

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Freiburg. The papers were then carefully studied and their English mastered.

With only a limited knowledge of English, when either Krönig or Gauss attempt to make *extempore* speeches in our language, the result is picturesque but not exactly classic.

(Here is an example of Dr. Gauss's piquant English: Speaking of his handwriting, which is rather bold, he said, "My pen she is large.")

There are no published translations in English of Gauss's papers on the subject, and doctors come to Freiburg and go away in ignorance of all that he has written upon Twilight Sleep. To one American doctor I loaned my translations, and this doctor afterward told me if the American doctors could only get English translations of Gauss, they would in a few hours be much better able to grasp the idea of the method than they were after witnessing a limited number of births in the fourth-class ward.

We will now consider the charge brought against Krönig and Gauss by the American medical journals, of "instigating or endorsing such sensational puffs for themselves"—this refers to the publicity which has been given the method of Twilight Sleep by other writers and myself in American magazines.

Krönig and Gauss do not need or desire exploitation; in fact they made it as difficult as possible

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for a journalist to obtain information at the Frauenklinik; but they could not close the mouths of grateful mothers who had there had their children under Twilight Sleep; they could not prevent one from obtaining and translating Gauss's writings on the subject; they could not close the University Library with its volumes of medical magazines containing the records of the past eleven years' experimentation with scopolamin-morphin on the Continent; they could not prevent a sincere student from collecting data from the rest of the medical world wherever Twilight Sleep has been tried.

The Frauenklinik is not run for money; it is a State institution and is endowed by the Grand Duke of Baden. It is a small hospital and can only accommodate a limited number of first-class patients, therefore American mothers were not particularly welcomed, but they could not with humanity be turned away after they had come from such a distance to beg for painless delivery.

The American mother, however, who occupied a first-class room in the Frauenklinik at an absurdly low cost could not escape the unpleasant realization that she was practically accepting the hospitality of the Grand Duke of Baden, for she was occupying a room and being benefited by terms planned for the subjects of the Grand Duke only.

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Drs. Krönig and Gauss — absorbed as they were the past year, in their investigations of radium — did not by any means enjoy the vast number of visiting physicians from abroad who, awakening at last to the wonders of Twilight Sleep, came and begged to be shown. One of the doctors of the Frauenklinik naïvely complained: "It makes me so nervous to have eleven strange doctors watching me."

Krönig and Gauss did not want to be interrupted and bothered, and as Dr. Krönig said to one American doctor who was criticizing the method: "Why do you come here? We don't ask you to — we don't want you."

The doctor replied: "What choice have we? We must find out about this thing and to do so we have to come to the fountain-head."

It is absolutely unfair to the entire staff of the Frauenklinik to insinuate, as the *Journal of American Medical Association* of Chicago has done, that these doctors have shown "an advertising initiative which bids fair to rival Friedmann."

For the advertisement which Twilight Sleep has had we must blame the thankful mothers — if blame there be — who desire that their sister-mothers may know the wonders of this method. These mothers feel that the opposition of the American physicians is unfair and prejudiced, and furthermore in some

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cases unreliable because based on snapshot views of the Dämmerschlaf.

There is something curiously sardonic in the following fact: After the most bitter opposition to the Freiburg method had come from the American medical profession, Twilight Sleep to-day in the Freiburg Frauenklinik is almost dependent for its continuance upon one American physician.

This doctor came to Freiburg with other Americans to study the Dämmerschlaf and he was there when war was declared.

Dr. Krönig had to leave immediately to take charge of a large hospital for the wounded near the fighting line in Alsace-Lorraine, outside of Carlsrhue; Dr. Schneider had gone to the front at the outbreak of war; Dr. Gauss went with the forces as surgeon and reserve for the aëroplane service, and all the other German doctors, except one, were with the army, so the poor Frauenklinik was almost depleted.

The Headnurse (Oberin) to whose devoted cooperation Krönig and Gauss owe so much of their successful development of Twilight Sleep, is a number of the Red Cross Baden Frauenverein; all her desires naturally led her to want to join the army at the front, but she soon saw she would be far more needed at the Frauenklinik by the mothers who, war

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or no war, must continue to bring children into the world, so, unselfishly putting aside her own impulses, she remained in Freiburg at her post.

The Headnurse appealed to this visiting American doctor to stay and assist her in conducting the cases of Twilight Sleep; he promised to remain if possible throughout the war. So we have the singular anomaly of an American providing painless childbirth for the German mothers! It seems after all but the just payment of a debt which America owed Freiburg for the relief which the Frauenklinik had brought American mothers.

AN AMERICAN DOCTOR WHO WAS CONVERTED TO TWILIGHT SLEEP

Here is the experience of W. H. Wellington Knipe, A.M., M.D., Adjunct Professor of Obstetrics, New York Post Graduate Medical School and Hospital; Attending Obstetrician, Gouverneur Hospital.

Dr. Knipe spent a fortnight in Freiburg in July. He came there with almost as much prejudice against the method as has been shown by the other American doctors whose opinions are quoted in the beginning of this chapter; now hear, in his own words, how Dr. Knipe changed his opinion:

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"Having used scopolamin-morphin in my hospital work several years ago and having discarded the method as dangerous, I entered Freiburg a skeptic; and it was only after repeated demonstrations of successful Twilight Sleep that at last I became a convert and I was forced to admit the poor results that we had obtained previously with scopolamin-morphin were due to the fact that we did not follow the Freiburg rules." [1]

Dr. Knipe has here voiced the truth about the attitude of all the American doctors who have discarded and then opposed the method; he furthermore honestly confesses that the American failures were "due to the fact that we did not follow the Freiburg rules."

Dr. Knipe's next sentence is important both as a prophecy and an acknowledgment of the importance of Twilight Sleep.

"Inasmuch as the Freiburg treatment is bound to become the method of the future, it will become necessary for the hospital to have proper accommodations for these cases."

The title of Dr. Knipe's paper is "Twilight Sleep from the Hospital Viewpoint."

[1] From *The Modern Hospital*, Vol. III, No. 4, Oct. 1914. Published in St. Louis. Pages 250-251.

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He continues:

"The one requisite for the proper induction of Twilight Sleep is quiet.

"The proper location of the delivery-room is an inside court where the least possible noise obtains."

In Freiburg, the ward delivery-room opens on to the court-yard in which there are trees and flowers; the only sounds which disturb the quiet of the court are the songs of birds and the occasional rubber-tired entrance of a motor car.

Often times the groups of women in this court suggest a scene lifted bodily from light opera — which may seem an incongruous simile, considering the portent of these women's presence at the Frauenklinik — these mothers are frequently peasants from the Black Forest who are arrayed in full skirts, and be-ribboned, picturesque head-gear — costumes which we foreigners only see upon the stage when at home.

Here the mothers-to-be sit in serene patience in the sunlight and shade, awaiting their hour of delivery — serene and unafraid — for they realize that in Twilight Sleep they will be mercifully oblivious of the trial of childbirth.

To resume the quotations from Dr. Knipe:

"All care should be exercised that the noise from the rest of the hospital should not reach the Twi-

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light room. This quiet may be procured by double doors, padded doors, rubber matting, etc. In the private operating room, where only one patient is at a time, it will be relatively easy to obtain the desired quiet, but in the ward operating-room where there may be two or three patients at one time — which of course is unavoidable in a large service — one patient may disturb another to some degree.

"Besides quiet, means must be used to obtain darkness. It is not necessary that this should be intense, but all care should be used to prevent the entrance of bright light.

"During the inducing of Twilight Sleep the patient is kept in the delivery-room and in bed and inasmuch as the process consumes generally several hours it is impossible to keep the patient on the hard operating table all this while. At Freiburg the delivery-room contains three beds and it is in these beds that the women are delivered, the operating table being only used for those cases requiring operative interference such as forceps, version" (turning of the child), "etc. Each bed is screened from its neighbor by curtains of muslin and the rest of the delivery-room is like an ordinary operating room with the regulation aseptic furniture, sterile receptacles, instruments, trays, etc."

I remember observing once that the only unsani-

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tary, unwashable thing in the room was a calendar.

Dr. Knipe lays great stress on the importance of the proper nursing in Twilight Sleep.

The nurses at the Freiburg Frauenklinik are frequently Black Forest peasants who are physically strong and mentally intelligent, responding easily to training. Dr. Knipe says these nurses must have had at least four months' experience as assistants in the delivery-room before being placed in charge of a case. The nurse examines the heart of the unborn child every fifteen minutes, tests the patient's various reflexes, and gives the injections accordingly, subject to the instructions of the attending doctor who comes regularly every hour to examine the Twilight Sleep patient. These nurses become peculiarly expert and, as Dr. Knipe says, " it will become necessary for us in America to take especially intelligent nurses who are interested in this work and train them in this particular method," if we are to have a similar success to that attained in Freiburg.

Dr. Knipe speaks of the Straub Scopolia Haltbar (invariable scopolamin), which is made by the addition of " the sexatonic alcohol mannite to the scopolamin solution;" he is, however, mistaken in his statement that this preparation is " manufactured by one of the German drug firms"; Hoffman La Roche's factory is situated in Switzerland and since

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the war began the firm have issued a statement declaring they are not German.

Dr. Knipe says, "There seems to be no reason why the chemist should not make up a stable solution for hospital use by the addition of mannite so that 1 cc. of the solution equals .0003 g. scopolamin."

The bed exercises of which I have written in a former chapter, from what I have seen in the first-class ward, are described by Dr. Knipe as follows:

"Within twenty-four hours after the birth of the child at Freiburg passive exercises are instituted of the upper extremity, abdomen and back and lower extremities and perineum of the patient, and it will become necessary in hospital work to instruct the nurses in the method of giving these exercises."

In addition to describing one of the exercises which I have already given, Dr. Knipe gives another which is new:

"Separating the knees with the patient resisting and in approximating" (bringing together again) "the knees against the patient's resistance. The patients take kindly to these exercises and claim they feel very much better after them. . . ."

After the exercises have been continued night and morning, he says, "it is surprising with what rapidity the uterus involutes" (shrinks back to the normal).

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"If the patient is running a temperature or if there has been a bad laceration of the perineum, the patient is kept in bed for a longer period and the exercises are not taken."

Dr. Knipe then writes of the necessity of keeping a chart of accurate notes on the conduct of the birth such as is kept at the Frauenklinik (I have given this chart in Chapter V), and he says that "it is only by keeping strict record of these conditions,"— amount of injections, character of pains, voluntary muscular efforts of the patient, after-birth hemorrhage, the condition of the newborn, etc.—"that one is able to judge of the value of the method."

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XVIII

The British Success With Twilight Sleep

THE most striking feature of the British reports on scopolamin-morphin is the perfectly fair, unprejudiced, open-minded attitude of the British doctor.

As you now know, from Chapter III, Twilight Sleep is no longer a mere experiment in Britain; it is the same settled institution that it is in Germany and many other foreign countries.

There is no doubt that within a few years every doctor in Great Britain will employ scopolamin-morphin in birth just as he now employs chloroform in operations.

From my personal inquiry of the British doctors, I find the majority of them employ the scopolamin made by Burroughs Wellcome: Sir Halliday Croom and Dr. Constance Long both spoke particularly of the great purity and dependability of the Burroughs Wellcome drugs.

While these reports given in this chapter naturally deal with the early experiments of the British doc-

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tors with Twilight Sleep, I am able to assure you that all the doctors — except Dr. Corbett, who is no longer attending maternity cases — whose reports I here give, are to-day firm adherents of the method, and, as Sir Halliday Croom said: "It is now such an everyday affair to administer scopolamin-morphin to our patients we no longer think of keeping records of these births."

SIR JOHN HALLIDAY CROOM [1]

Sir Halliday Croom's report, made in 1908, deals with his first sixty-two cases.

He began his experiments with the small dose of $\frac{1}{400}$ of a grain of scopolamin with $\frac{1}{6}$ of a grain of morphin with uneven results, but a diminishing of the painfulness of the uterine contractions although consciousness was in no way abrogated.

"Strangely enough," writes Sir Halliday Croom, "with this dose the patients all complained of excessive thirst. The effect upon the child was absolutely nil."

He eventually increased the dose to $\frac{1}{100}$ of a grain of scopolamin to $\frac{1}{6}$ of a grain of morphin, and found the results much more satisfactory.

[1] "A Short Experience of Scopolamin-morphia Narcosis in Labor," by Sir. J. Halliday Croom, M.D., F.R.C., S.E. Professor of Midwifery, University of Edinburgh. *Obstetrical Transactions*, Edinburgh, Vol. XXXIV, pages 1908-09.

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"The painfulness of the contractions was in some cases entirely abolished. The patients slept soundly in the intervals between the pains, and in most cases for one or two hours after the completion of labor. It is to be noted that with the larger dose of either $\frac{1}{200}$ or $\frac{1}{100}$ of a grain there was never any complaint of thirst such as was so striking with the smaller dose of $\frac{1}{400}$ of a grain of scopolamin.

"Seventy per cent. of the children in these cases were born vigorous, 27 per cent. required slight reviving, and 3 per cent. required thorough resuscitation. No children were lost.

"In 37 cases one injection of the drugs was sufficient to obtain the desired effect. In the other 25 cases, one or other or both drugs were repeated in doses varying in the case of scopolamin from $\frac{1}{400}$ to $\frac{1}{100}$ of a grain."

Sir Halliday Croom found that the repetition of the scopolamin prolonged and slightly deepened the effects upon the mother and child, but the repetition of morphin caused a much more distinct increase in the effects, particularly upon the child. "So much so was the case that latterly I gave up repeating morphia entirely."

Sir Halliday, after going into details of the effect of different doses on different groups of cases, continues:

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"I gave the drug mainly in the second stage of labor and found that the results were threefold.

"1. It acted as a soporific.[2]

"2. It produced narcosis and in some cases even complete anesthesia.

"3. It appeared to cause amnesia, abolishing remembrance of the suffering during labor.

"The drug was administered once or twice during the second stage, not oftener. The soporific effects were very marked as a rule, sleeping between the pains and only awakening to a certain limited extent during the acme of the pain. The pains themselves were very much modified, the patient complaining only of discomfort, not actual pain.

"The sleep after labor lasted for two or three hours in most cases."

In two cases forceps were used and the patients delivered artificially without suffering.

"Perhaps even more striking is the fact that in almost all cases the memory of the pain suffered was either very much blurred or altogether abolished. In several cases the patients woke up two or three hours after the completion of labor without any recollection whatever of what had taken place and could hardly be persuaded that their labors were

[2] A medicine which produces sleep as distinguished from a mere anodyne, which only soothes.

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over, until their children were produced in evidence. In many cases the whole circumstances attending labor were a mere reminiscence, and the patients remembered the pains only in a vague manner as if they had occurred far away."

"Where the drug was administered during the first stage of labor it sometimes hastened the dilation of the cervix" (neck of the womb).

"I noted no bad results whether to the heart, respiration, or pulse, and even in the minority of patients, who did not respond at once to the treatment, there were no bad results.

"The only untoward effect, as far as my experience goes, is the fact that the child is often born sleepy and almost comatose and remains so for some time after birth. The child is not actually stillborn but it breathes only slowly, does not cry, and has all the appearance of being under the influence of the narcotic element. This has never been a serious complication, but one easily dealt with by the ordinary methods of revival, and no children's lives were sacrificed."

It is comforting to realize how much the last six years have changed Sir Halliday Croom's opinion as to the "untoward effect" on the child, for he now considers scopolamin-morphin without danger to the child and says the child is only born sleepy when

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there has been faulty dosage of the mother. If the child should be born oligopneic, Sir Halliday's maxim — as you may remember — is now, "Let them alone and they'll come to."

His many years' experience with Twilight Sleep has also altered the following opinion, expressed after the first sixty-two cases:

"No untoward events occurred in the administration of the drug so far as the mothers were concerned except perhaps a possible tendency to post-partum hemorrhage. In 3 cases of the 62 that was noticeable, though not to any dangerous extent."

These three cases must have been the ones which Sir Halliday said had been reported to him by other doctors attending the cases of scopolamin-morphin patients, for, as you may remember, he said to me that personally he had had no experience with a tendency in his own patients to after-birth hemorrhages.

"Of the 62 cases none were totally insusceptible to the drug, but it must be admitted that the susceptibility of patients varied very considerably. In one case the result was just the opposite from what was looked for, the patient becoming excited — almost violent — and required the administration of chloroform."

Sir Halliday Croom's long experience with the

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drugs has now produced such certainty of technic that these uncertain results are no longer experienced.

He finds that this method in private practise "enables one to avoid to a considerable extent the distress and anxiety to the relatives caused by the outcries of the sufferer. Moreover, the drug can, without bad effect, be administered at a considerably earlier stage in labor than is the case with chloroform."

The method does not delay the early stages of birth; "in some cases it even seems to expedite the dilatation of the os, as I have already pointed out, and it certainly serves to tide the patient in comfort over what is to her so often the most tedious and trying part of labor. . . . As regards its effect on the duration of labor, I am not convinced that it in any way hastens the process. At the same time I do not think that it delays progress, because the scopolamin appears to counteract any influence which morphia might have in stopping or weakening the pains. I am inclined to think that on the whole the administration of scopolamin and morphia makes very little difference to the duration of labor."

Sir Halliday Croom considers the only counter-indications for the use of Twilight Sleep are feeble-

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ness or irregularity of pains, or where the patients are physically weakened.

The best dose he has found to be $\frac{1}{200}$ of a grain scopolamin + $\frac{1}{6}$ of a grain morphin, administered when the pains occur regularly at intervals of a few minutes.

"The scopolamin may require to be repeated in the course of one and a half or two hours. As a rule, $\frac{1}{200}$ of a grain scopolamin is sufficient as a second dose.

"But in all cases the dosage — and this particularly refers to the second dose — must be gaged by the patient's state of mind as to wakefulness or excitement, and by her power of perception and memory of what is going on around her."

Sir Halliday Croom employs scopolamin in the tabloid form as prepared by Burroughs Wellcome, which is very carefully standardized as to dosage.

The finalé of this most valuable paper on Twilight Sleep is:

"On the whole, I am of the opinion that there can be no question that in scopolamin-morphia narcosis we have an efficient means of controlling the pain of labor and one that is practically safe when ordinary precautions are taken."

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DR. CONSTANCE LONG

At a meeting held on the 7th of January, 1913, the president of the Association of Registered Medical Women, Dr. Constance Long, read a paper on "Scopolamin-Morphin in Labor." [3]

She had used these drugs in private practise and had not found that labor had been protracted beyond the average time, nor had the infant been in any way endangered, in spite of a certain amount of cyanosis (a congestion of the venous system so that the blue blood of the veins discolors the skin) at birth. "The dangers to the child have been overstated by British writers.

"Scopolamin is a perfectly safe drug for the mother, provided its dosage is understood. For the safety of the child, the initial dose of 1/6–1/8 of a grain of morphin should not be repeated.

"The effect of the drug in modifying labor pains, combined with the amnesia commonly produced, might abolish the dread of parturition" (the bringing forth of children) "and thus induce a rise in the birth-rate.

"The constant attendance of the physicians is not essential, provided an intelligent nurse is in charge.

"The patient should be kept on her side until the

[3] *British Medical Journal*, Jan.-June, 1913.

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effects of the drug have passed off and the same precaution should be observed with regard to the infant."

Dr. Long tells me that her first injection is 1/100 of a grain scopolamin to 1/6 or 1/8 of a grain morphin; the second injection is again 1/100 of a grain scopolamin alone or otherwise 1/200 of a grain scopolamin.

She employs the memory test, gaging her dosages entirely by the apperception of the patient.

DR. R. C. BUIST [4]

The following paper was read by Dr. Buist at the meeting of the British Medical Association at Sheffield in 1908.

Dr. Krönig, who was present, had just presented another paper on "Scopolamin-Morphin Narcosis in Labor" immediately before Dr. Buist. I will not here reproduce Dr. Krönig's paper, as it differs but little from his publication on the subject which I have already given in Chapter X.

Dr. Buist's address was as follows:

"Soon after the appearance of Gauss's paper, I gave my ward sister instructions that in any cases

[4] "The Use of Hyoscin-morphin Anesthesia in Natural Labor," by Robert Cochrane Buist, M.D., C.M. Edinburgh. *British Med. Journal,* July-Dec., 1908. Vol. II.

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where the labor became distressing the patient should have an injection of hyoscin and morphin. In the earlier cases I was summoned to each case and of the later cases I have seen a large proportion at some stage of their progress.

" The practical conclusion is that I use the method freely in private practise, that when I am in charge of the maternity wards it is used as a routine method, and that the house surgeon uses it when I am in charge of the out-patient department.

" For the best results it requires a little experience in dosage, but properly employed it is capable of saving the practitioner many a worrying day and weary night and the patient much exhausting restlessness and some operative deliveries."

Dr. Buist reports on only sixty-five selected cases — thirty-one were mothers bearing first children — the records of which were made by pupil nurses whose task was to observe the uterine contractions.

" The uterine contractions seemed essentially to be unaffected. In case after case their interval is the same before and after the injection, and if in some cases the patient goes fully to sleep she is found to have made progress when she is again examined. In many cases the contractions became more regular."

In the hospital Dr. Buist employs .00065 g. (=

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1/100 of a grain) scopolamin + .01 g. (= 1/6 of a grain) morphin, but in private practise he has generally found .016 g. (= 1/4 of a grain) morphin to be the more satisfactory dose.

Dr. Buist's rule for procedure is:

"Whenever your patient is distressed by the pains and you expect the labor to last more than an hour, give an injection of hyoscin and morphin; if you expect it to last a considerable time, return in from three to four hours and if necessary repeat the injection. The second dose may be of morphin alone or of hyoscin alone or of both, as you think necessary, to produce the mental condition you desire. If you think from the examination that the contractions are really violent, lay stress on the morphin; if you think that the patient is reacting excessively to what contractions she has, emphasize the hyoscin."

In addition to Dr. Buist's experiences at this early time his house surgeon used the method in thirty cases with results parallel to Dr. Buist's.

The concluding words of this paper are:

"It is difficult to describe the attractions in private practise of a method which relieves the patient's suffering while it allows labor to progress regularly and which does not require the constant personal presence of the medical practitioner, as the obstetric anesthesia with chloroform does."

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In Chapter III I have told of Dr. Buist's continued and successful employment to-day of Twilight Sleep, both in private practise and the Dundee Royal Infirmary.

DR. DUDLEY CORBETT [5]

Dr. Corbett makes the following conclusions on the value of Twilight Sleep:

1. "The scopolamin-morphin combination is of great value where hysteria and distress are manifest during the first stage of labor. If possible, it should only be given in the first stage and not repeated.

2. "No ill effects to the mother need be expected even with full and repeated doses.

3. "No ill effects need be expected for the child even where the mother has had full and repeated doses, provided the delivery does not take place at four hours or less from the time of the last dose, otherwise apnea will ensue. On the other hand, where the drug is without effect on the mother it is not likely to affect the child even if born within the four hours.

4. "The cause of apnea is probably the morphin, and so where it is necessary to give the drug late

[5] "The Use of Scopolamin-morphin in Labor," by Dudley Corbett, M.A., M.B., B.Ch. Oxon. Late House Physician, General Lying-in Hospital, York Road, Lambeth, S. E. *British Med. Journal*, April, 1911.

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in the first stage or early in the second, the morphin should not be given in larger doses than ⅛ of a grain or omitted.

5. "A hot bath is the best treatment for the apnea.

6. "Strychnin may prove to be a useful addition to the mixture. It does not diminish the analgesic effect of the combined drugs and it may help to prevent the apnea of the child."

Dr. Corbett is now at St. Thomas' Hospital in London and as he has forsaken this branch of medicine he was unable to give me any further information on the subject of scopolamin-morphin.

DR. ARTHUR INNES[6]

Dr. Innes says:

"In the majority of cases the baby is born with little knowledge on the part of the mother and certainly with little remembrance of pain.

"In several cases the freedom from pain has been remarkable. In one case of primipara" (first child) "where the os was of the size of a five-shilling piece, the baby was born without the knowledge of the mother and it was then found that the placenta was adherent. After waiting for three-quarters of an

[6] "Hyoscin-morphin Anesthesia in General Practise," by Arthur Innes, M.B., B.Ch. *The Practitioner*, 1912 (1).

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hour it was decided to remove the placenta by separating it from the uterine wall. This proved a rather difficult matter, but in spite of that, the patient required no other anesthetic and her only complaint all the time that the manipulations were proceeded with was that she was thirsty and would like a cup of tea!"

There were no cases of anything approaching post-partum hemorrhage nor did the convalescence seem slower.

Dr. Innes says the pains do come a little slower, but that "the lessening of the tension on the nervous system of the patient is a great help.

"It seems to me that in this drug we have a great help to the parturient" (child-bearing) "woman and that with a minimum of risk to herself or her child."

Dr. Innes' first experiments with Twilight Sleep were made in November, 1909.

DR. J. R. FREELAND AND DR. BETHEL A. H. SOLOMONS[7]

I am deeply indebted to Dr. Solomons for so kindly sending me the valuable pamphlet written by him and Dr. Freeland on Scopolamin-morphin.

[7] "Scopolamin-morphin Anesthesia in Labor," by J. R. Freeland, M.D., Univ. Penn. L. M., and Bethel A. H. Solo-

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This pamphlet deals with one hundred cases of primiparæ; they believed that the tests of a comparatively new anesthetic would be more valuable if cases of women bearing their first babies were selected, because the average duration of labor is longer in such cases and the occurrence of abnormalities, such as after-birth hemorrhage and adherent afterbirth, are less common.

The reason their record is confined to one hundred cases is that they only administered scopolamin-morphin when the labor ward was quiet and comparatively empty and therefore stricter attention could be paid to both mother and child.

Drs. Freeland's and Solomons' experiments were the direct result of Dr. Krönig's paper read at Sheffield in 1908, and they followed as closely as they could the Krönig method of administration with the exception of the fact that they often administered the drugs by mouth instead of by hypodermic injections.

The dosage decided upon after various experiments was $\frac{1}{120}$ of a grain of scopolamin + $\frac{1}{8}$ grain morphin. The morphin was not repeated in subsequent injections.

mons, M.B., Univ. Dublin. L.M., Assistant Masters Rotunda Hospital, Dublin. Printed for the authors by John Falconer Dublin, also published in *British Med. Jour.*, Jan., 1911.

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Drs. Freeland and Solomons carefully avoided producing too deep a narcosis, saying:

"We consider the purpose of the drug fulfilled if the patient sleeps between the pains, waking up with more or less demonstration during the height of the contraction and again falling to sleep when the pain is over."

This is what Gauss would call an ideal Dämmerschlaf.

Drs. Freeland and Solomons selected patients who were particularly noisy and demonstrative in order to be able to say definitely how much effect the drug had on the sensibility of pain.

In 10 cases there was complete analgesia, the women having no knowledge of pain even when the child was born.

In 57 cases there was a marked effect, sleeping between pains and a great decrease of suffering.

In 20 cases the effect was fairly good as far as relieving the pain to a certain extent, though the patients did not sleep at all.

In 13 cases there was no effect, due in four cases to vomiting of drug and in 8 to their having received too small a dose.

In some of the cases showing prolongation of labor it was due to the fact that the doctors deliber-

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ately chose "patients least capable of bearing pain — in other words those bound in any event to have a more or less protracted labor."

As for the effect on the child, they write:

"Much has been written about the dangers to the fetus" (the unborn child), "but from our cases we concluded that this has been exaggerated."

There was only one child born in a condition of apnea and the condition was attributed to morphin.

Drs. Freeland and Solomons say it is unnecessary continuously to watch the patient. They employ the same caution, mentioned by Dr. Long, of keeping the patient on her side to prevent the tongue falling back during the anesthesia sleep.

They do not believe in keeping the room dark, as they feel it interferes with the nurse's watch for complications.

There were 19 cases of forceps, due in most part "to the selection of the cases and the inclusion of cases of inertia."

There were 2 cases of postpartum hemorrhage, occurring after the administration of chloroform for the use of forceps.

The conclusions reached by Drs. Freeland and Solomons are:

1. "Scopolamin need not be given in larger doses than $\frac{1}{120}$ grain.

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2. "In the majority of cases it may be given advantageously by the mouth.

3. "It is undesirable to keep patients in a darkened room whilst under its influence.

4. "The patient should be carefully watched. This can be done equally well by the nurse as by the doctors.

5. "No ill effects to mother or child need be expected to follow the rational administration of scopolamin.

6. "Whilst its chief indication will be found during the first stage of labor, the fear of rapid delivery following its use is not a contraindication."

Dr. Solomons informs me that he still uses scopolamin "on the lines set down in this paper."

The British reports form the strongest combined verdict on the merits of Twilight Sleep to be found anywhere.

There is positively no excuse for any woman in Great Britain to suffer longer in childbirth when she can go to doctors of the highest professional standing, and obtain the relief of Twilight Sleep.

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XIX

Conclusion

I NOW make my last appeal to every woman who has read this book to take up the battle for painless childbirth where I have left off.

I have only been able to provide you the arms wherewith to fight, the real battle and its victory lies in your hands now.

Fight not only for yourselves, but fight for your sister-mothers, your sex, the cradle of the human race. Realize to its fullest the tremendous importance of this relief of women in labor, the positive necessity of removing the dread of birth-pain from the mind of women, a dread which has steadily grown until it has developed into a social menace.

Since it has been known that I am writing a book on this subject I have been appalled by the confidences of women; I have actually been told by unmarried women that they have remained single because of their fear of the tortures of birth; mothers of only children have confessed that the terror of a repetition of the indelibly-impressed agony which

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they suffered in the birth of their first child has prevented them from ever having a second child; married women who have had no children have told, with the starved eye of cheated motherhood, of the cowardice which has made them childless — they had heard too much of the agony through which other women had passed.

There are, however, other women to whom motherhood is the crowning glory of life, who say — and believe they mean it — that to have a child is worth going through the tortures of the Inquisition itself; but these women are rare and, in their way, as abnormal as the woman who avoids marriage through a cowardly fear of childbirth.

The normal human feeling is to abhor pain, to want to banish pain from the world for oneself and all one's fellow creatures.

Pain is destructive, disintegrating, inharmonious, undermining, unnatural, unnecessary.

Of course after a woman finds she is to become a mother and feels within her the great mysterious workings of gestation, the growth in her body of a wondrous new life, that little life becomes to her far more important than her own; as the months pass, verging toward the great climax when the life dependent on her shall assume its independence, the supernal sense of motherhood effaces all human in-

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stincts of fear and self-preservation and the mother is willing to give her life, if need be, in order that her baby may be born safely. No man can ever fully realize the truth of this self-effacement of maternity, for no man has ever carried within his body the burden and the treasure of a child.

If a man loves a woman deeply he then suffers almost as much mentally, as she suffers physically, when the supreme hours of trial arrive. Men have written eloquently of man's torture at this time.

Twilight Sleep therefore concerns the men as vitally as it concerns the woman.

I shall never forget the face of a husband banished from his wife's room during her childbirth at the Freiburg Frauenklinik; his face was distorted with misery, pallid with terror. It was not the first time he had waited and watched through specter-filled hours while the woman he loved lay behind a door sealed to him, for this was his fourth child.

The birth of the first had almost cost him his wife, the second had been a repetition of the horrors of the first, in the birth of the third child the mother had been saved but the baby had had to be sacrificed and the doctor attending had solemnly warned against further children. After some years of invalidism it was found that this woman was to become a mother again. Imagine that husband's state

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of mind, for he believed it to be the death knell of his wife. Then he heard of Freiburg, of Twilight Sleep, of a painless and safe method of childbirth. Within three days of having heard of the wonders of the scopolamin-morphin method he began the journey to Freiburg with his wife. Even Professor Krönig and Dr. Gauss felt alarmed when they heard the shocking details of the former deliveries.

When the Twilight Sleep birth of the fourth child was over, Dr. Krönig said to the husband:

"Why were the forceps ever used on your wife? — there was certainly no structural reason. I never saw a more normal, spontaneous birth."

One week later this mother attended the christening of her boy-baby at the Cathedral!

Not long ago a Japanese doctor was discussing western medical methods with me, especially the wide-spread use of the forceps which he greatly condemned.

He gave the following adage which they apply in Japan to operative interference in birth:

"When the caterpillar is emerging from the cocoon, do not touch; if you interfere, you may not only spoil the cocoon but you may kill the caterpillar."

The whole future welfare of the child is dependent on its proper advent into this world and the en-

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tire after health of the mother lies in the balance during childbirth.

Many strong, healthy young girls become physical wrecks after the calamitous birth of a child.

It is not the reasonable sequel to romance that love should have this culminating agony and shattered health.

The kindling of love between a man and a woman is a wonderful thing; the mating of those who love has a sacred beauty; the merging of two lives into the life of a third is the holiest, most exquisite mystery in the world. The blossoming of this flower of the love of a man and a woman should be a continuation of the beauty of all that has gone to its creation, but is it? No. The culmination of love — the birth of the child — is surrounded only by thoughts of dread and torture.

As Dr. Birchmore has said "the pains of maternity have been a horrid and incontestable truth, but now these have vanished and the exhausting ordeal of motherhood is gone to be seen no more."

Through Twilight Sleep a new era has dawned for woman and through her for the whole human race.

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